APRIL 13, 1953

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

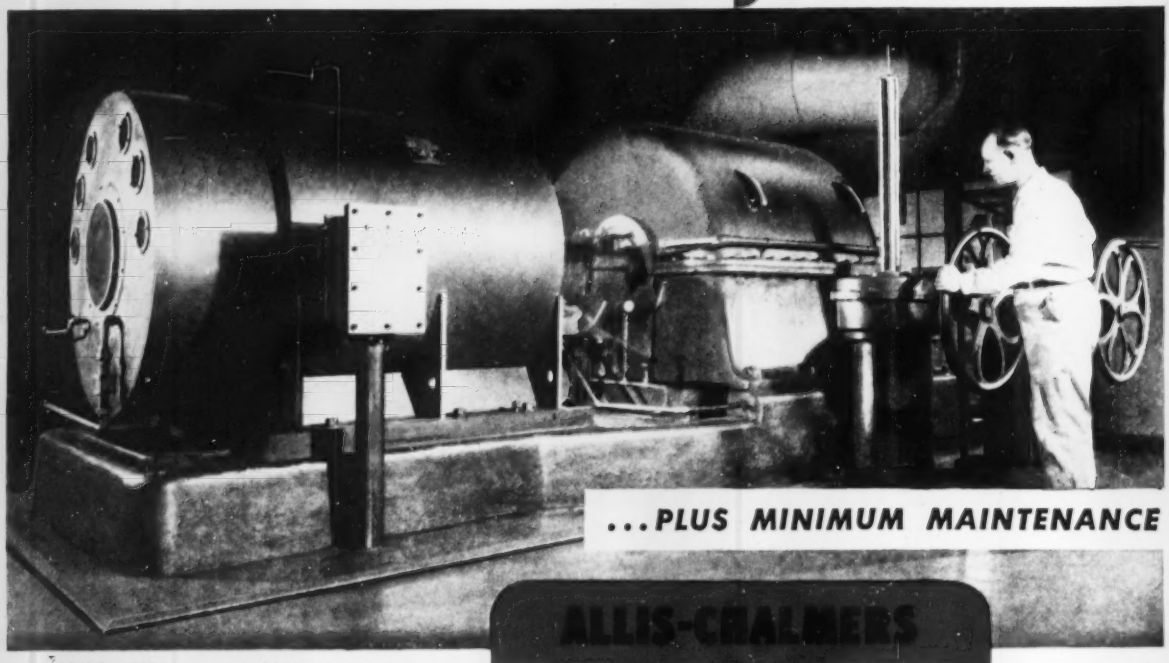
Research Brings Results

John Redmond (right), with Kennametal President Philip McKenna, shows how—p. 74

✔ NO GLUT IN METALS
Supply-Demand Balance Near, p. 63

✔ DUAL FREQUENCY HEATING
It's Practical for Forging, p. 140

YOU CAN HAVE Size... AND Safety TOO



1250-hp, 3575-rpm motor driving compressor.

ALLIS-CHALMERS Tube-Type TEFC MOTORS

A few years ago, explosion-proof motors were limited to small sizes — because there was no practical way to cool large totally-enclosed fan-cooled motors. Allis-Chalmers ended that limitation with the introduction of *tube-type* air-to-air heat exchanger construction in 1946.

Tube-type construction makes both large sizes and minimum maintenance possible because it provides:

1. **Full internal air circulation** plus *circumferential tube distribution* . . . to assure efficient, even cooling of motor.

2. **Complete enclosure** . . . to protect stator core and other electrical parts from both dirt and corrosion.

3. **Self-cleaning action** . . . result of generous flow of outside air through smooth, straight heat exchanger tubes.

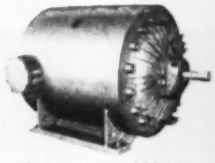
RATINGS AVAILABLE

Both standard and explosion-proof TEFC motors are built with *tube-type* construction in ratings from 40 hp at 600 rpm to several thousand horsepower. Ratings up to 800 hp at 3600 rpm are available with Underwriters' labels.

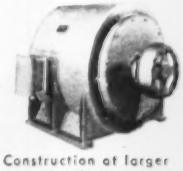
PROVED IN OPERATION

In sizes from 250 to 2500 hp alone, purchases of these *tube-type* motors total more than 215,000 hp. For more information about these motors that have been proved in operation indoors and out, call in your nearby A-C representative or write for Bulletins 51B7149 *(it's new)* and 05B7150. Allis-Chalmers, Milwaukee 1, Wis.

A-3669



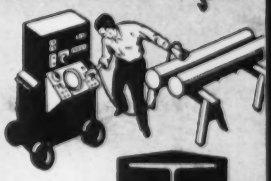
Ratings up to 800 hp, 3600 rpm.



Construction of larger ratings.

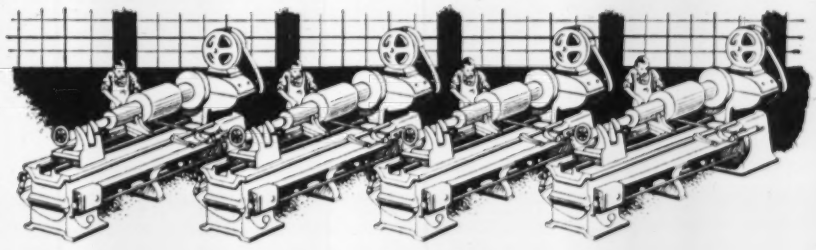
ALLIS-CHALMERS

Tool Steel Topics



BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation



Output up 150 pct with Red Sabre Bits

Four identical lathes, side by side, produced identical parts in one of our customer's shops. Using both high-speed steel and carbide tool bits, the rate per shift was set at 150 pieces per machine by the time-study engineers.

One of the lathe operators heard about our Red Sabre tool bits from a friend. So he brought one to work and began using it. He surprised himself by finishing 325 pieces in one shift, earning a nice bonus.

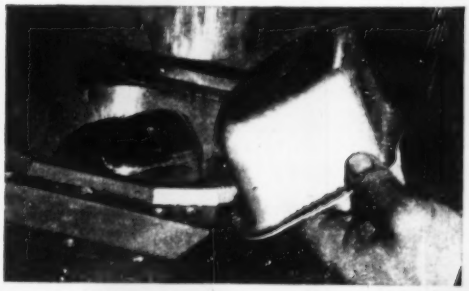
When he kept up his high rate, the payroll department began to ask questions. But a check-up showed that the operator's production was being reported correctly. In fact, his output increased to an average of 370 pieces.

When the time-study men got to the bottom of the mystery they really became enthusiastic. Red Sabre bits were installed on all four lathes. Output reached as high as 400 by increasing speeds and feeds.

Red Sabre bits are mighty popular in this shop because both the machine operators and the management are reaping the benefits of the increased output.

Red Sabre is our super high-speed steel. It has more wear-resistance and higher red-hardness than run-of-the-mill tool bits. Red Sabre tool bits, hardened to a minimum of Rockwell C-65 and ground accurately, are available in all standard sizes.

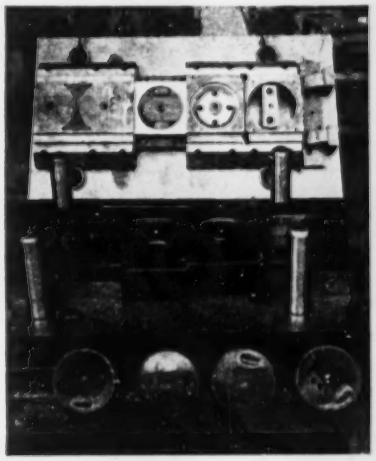
Like to try them in your shop? Order a couple from us at Bethlehem, Pa., or ask your distributor about a trial.



(Left) A kitchen-ware maker uses BTR* for the die that blanks and draws .032-in. aluminum to accurate size. The fit between the die halves is held to close tolerance to assure proper flow of metal during the one-stroke draw and to produce a smooth surface. This die has produced more than half a million pieces.

(Right) In a single operation these piercing dies, made of our BTR* tool steel, put 125 holes in the aluminum accessory for pressure cookers shown at the right. The punches were in excellent alignment after heat-treatment, and showed little evidence of wear after producing 165,000 pieces without requiring regrinding.

*BTR is an economical, general-purpose tool steel. Oil-hardening, it's easy to machine and heat-treat. Tough and wear-resisting, it's low in distortion.



HIGH-PRODUCTION DIE

This blanking, drawing, and forming die is made of high-carbon, high-chromium tool steel (our Lehigh H) to make possible long production runs. Operated in a 350-ton press, it produces end caps for a refrigeration unit. Hardened to Rockwell C-60, this die turns out about 100,000 pieces from 3/16-in. steel strip before redressing is needed. An air-hardening grade of tool steel, Lehigh H provides very high wear-resistance and the least amount of distortion during heat-treatment.

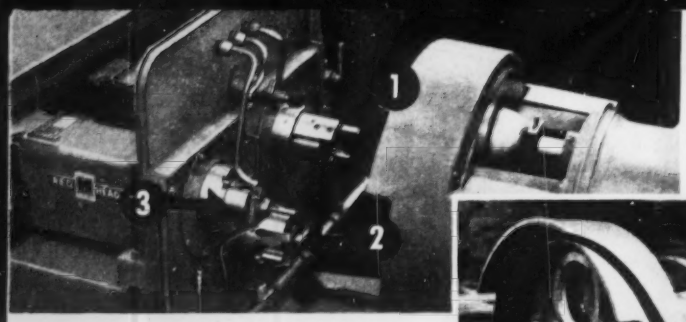
BETHLEHEM TOOL STEEL ENGINEER SAYS:

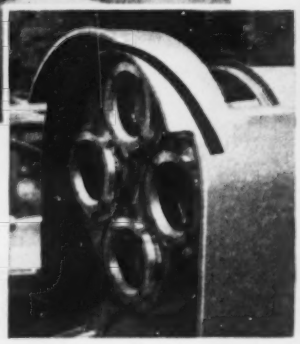
Remedy those fatigue-failures

Tools such as chisels, that are subjected to repeated stresses, often fail suddenly. As the tools are made from shock-resisting steel, these sudden failures can look mysterious. But close examination of the failed parts will often reveal that the failures were actually not sudden but occurred by progression of a crack part way through the section, followed by sudden fracture of the remaining section.

Fatigue-fractures have a characteristic, smooth-rubbed surface where the initial crack opened up, and an inner crystalline zone revealed by the final sudden break. Often the smooth-rubbed surface shows parallel "oyster-shell" markings, and may even show evidence of rusting.

Fatigue-failures usually begin at a stress-concentration point. This may be a notch, a poor fillet, tool mark, accidental nick, or a stamping. Correcting such design or mechanical faults is the cure.





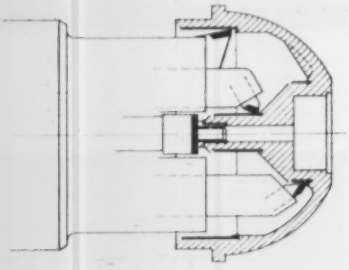
The three multiple-tool boringhead stations shown above perform a variety of precision finishing operations on eight different surfaces of fan motor end frames. Small cylinder at top station is an unloading ejector.

The workholding fixture shown at the right is rotated in 90° increments, presenting parts to each of the three boringhead stations in proper sequence, as indicated below.

ROTARY INDEXING

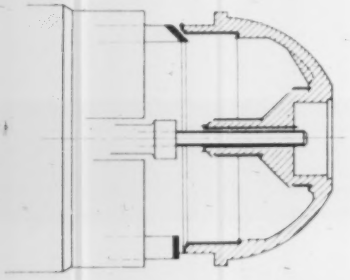
puts fan-motor housings on a high production basis

Heald Model 221 Bore-Matic bores, reams, turns, faces and chamfers motor end frames in continuous, consecutive cycle



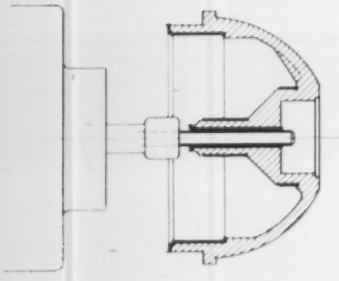
STATION 1.

Bore, turn two diameters, face shaft end and start reaming of center hole.



STATION 2.

Face and chamfer end of frame — rough ream full length of center hole.



STATION 3.

Finish ream center hole.

● Here's another example of how Heald engineering found the answer to a high-precision multiple borizing problem.

By means of the four-station rotary indexing fixture shown above, parts are presented in sequence to each of three boring-head work stations. The fourth station, at the top of the fixture, is used for loading and unloading.

For the long, small diameter center hole on this particular job, a reamer is used in preference to a boring tool in order to avoid chatter problems and assure a smooth, clean bore. The operations performed at each station are shown at the left. The entire machine cycle is fully automatic and parts are loaded and unloaded at the top station while the other three stations are borizing. A completely finished part is brought to the unloading station at each 90° rotation of the indexing fixture.

Remember — when it comes to precision finishing, it pays to come to Heald.

HEALD

Case Study No. 2240-96 in **PRECISION PRODUCTION**

INTERNAL AND ROTARY SURFACE GRINDING MACHINES AND BORE-MATICS

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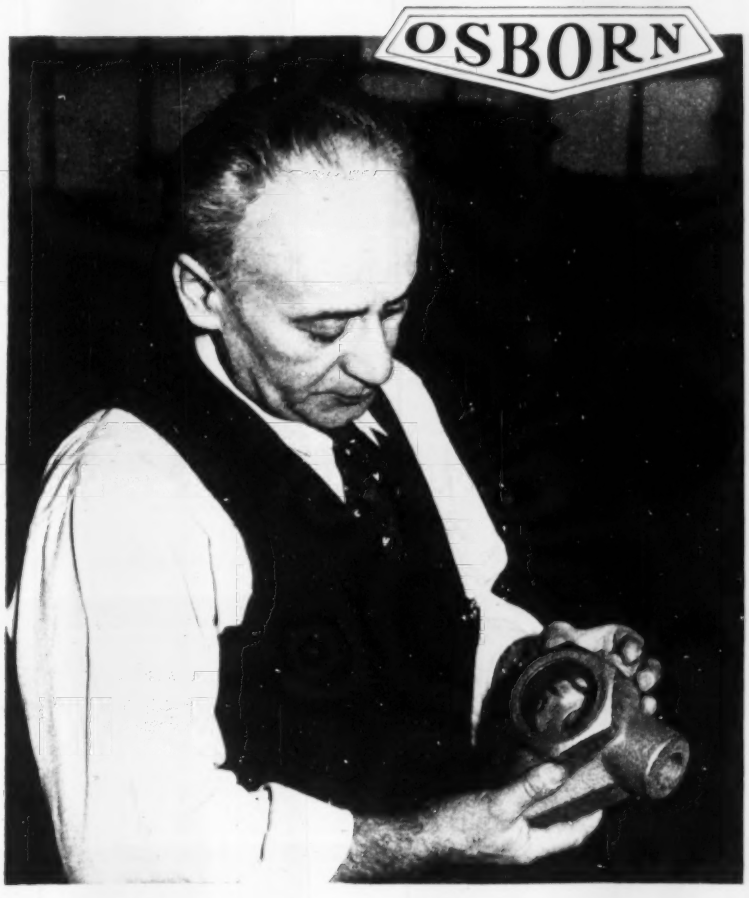
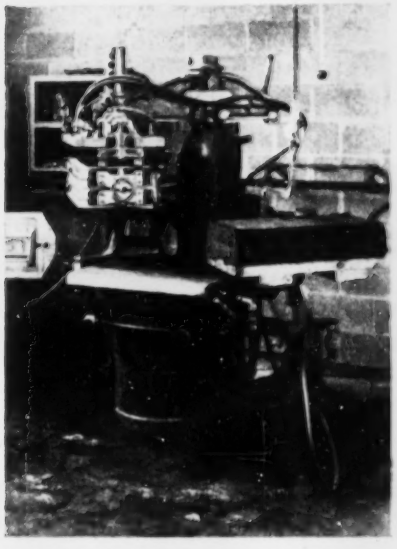


STEPS UP PRODUCTION 20 TO 90 MOLDS A DAY



SAVES ONE OPERATOR

Here Osborn's ROTA-LIFT has increased production 9 times. Formerly 20 molds a day were made by one molder and one helper . . . now 90 molds are produced a day with one molder and no helper.

How accurate castings can cut your machining costs

SIMPLY by improving the accuracy . . . the quality of your foundry molds through use of modern molding and core blowing machines, it is possible to reduce machining costs three ways:

1. Accurate castings are uniform in size . . . less metal is needed for finishing.

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Osborn Molding Machines

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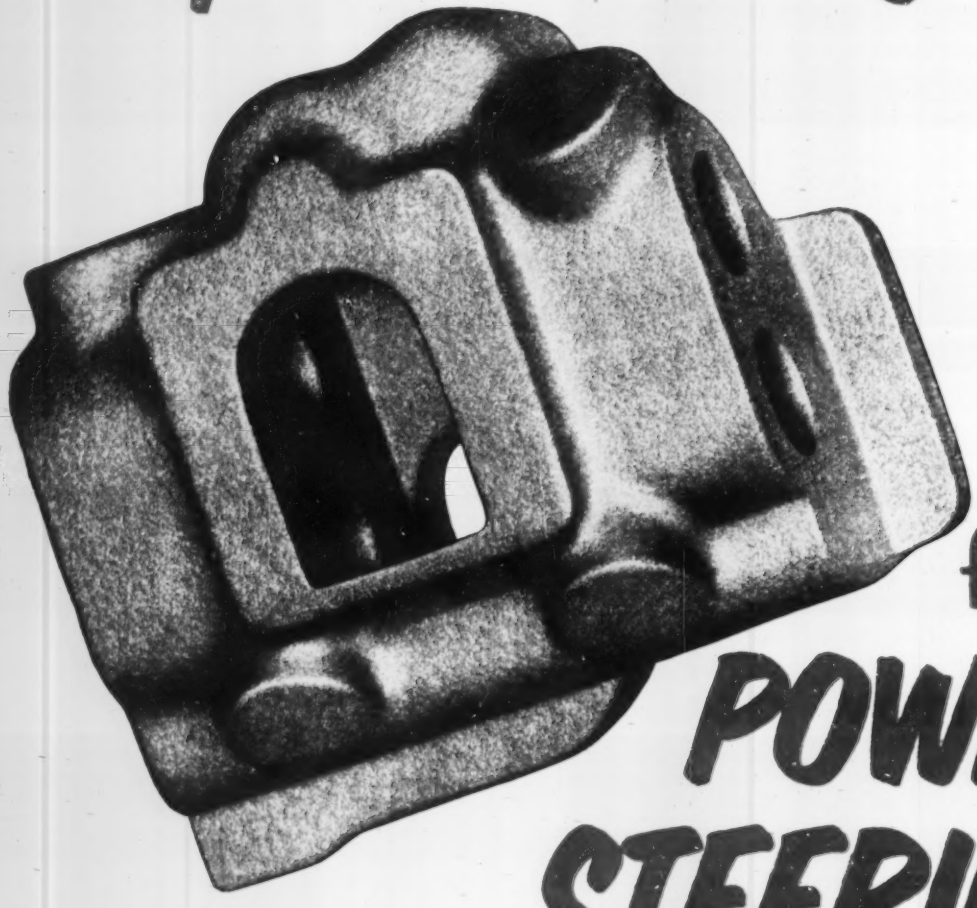
Eaton Permanent Mold Gray Iron Castings—



for

POWER STEERING

Send for your free copy of the 32-page illustrated booklet: "The Eaton Permanent Mold Foundry." It tells the story of Permanent Mold Castings and takes you on a picture-tour of the Eaton Foundry at Vassar, Michigan.

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This Week in Metalworking

STEEL

Vol. 132 No. 15 Apr. 13, 1953

✓NEWS ✓PRODUCTION-ENGINEERING ✓MARKETS

✓ **Metalworking Outlook** 55
New aspects of labor, research and other subjects are analyzed for your guidance by the editors

As the Editor Views the News 59

Windows of Washington 70
Reflections from the nation's capital report impacts of government upon industry

Mirrors of Motordom 77

The Business Trend 81

Men of Industry 85

✓ **Production—Engineering News at a Glance** 105

Cutting Fluids: Their Role in Machining 106
A study of the four basic properties of a cutting fluid and how they affect tool failure

Ceramic Coatings Boost Alloy Steel Use 110
A critical material-saving measure becomes a permanent fixture in finishing metals. Mass production helps

New Products and Equipment 117

Progress in Steelmaking 135
Liquid Blanket Reduces Oxidation of Molten Zinc—Dross formation reduced by regenerative crystal addition

Dual Frequency Heating—Lower Costs Open New Fields 140
Teaming of low frequency 60-cycle heating with a high frequency heat period is out of the pilot stage

✓ **The Market Outlook** 147
Metal Prices and Composites begin on Page 148

Metal Market 150

Behind the Scenes	6	Foreign News	73
Letters to the Editors	10	Obituaries	88
Checklist on Controls	69	Helpful Literature	121
Subcontract Summary	69	Calendar of Meetings	143

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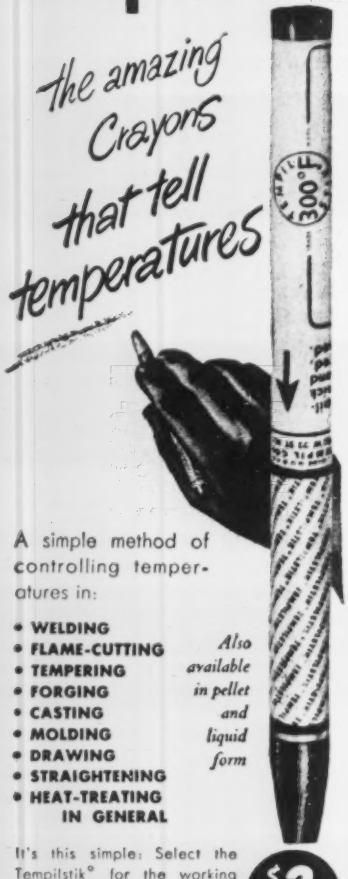
the amazing Crayons that tell temperatures



A simple method of controlling temperatures in:

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- TEMPERING
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- MOLDING
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150	300	550	1100	1650
163	313	600	1150	1700
175	325	650	1200	1750
188	338	700	1250	1800
200	350	750	1300	1850
213	363	800	1350	1900
225	375	850	1400	1950
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FREE —Tempil° "Basic Guide to Ferrous Metallurgy" —16¼" by 21" plastic-laminated wall chart in color. Send for sample pellets, stating temperature of interest to you.

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Behind the Scenes . . .

Meet John Morgan . . .

In a particularly curious mood one day last week, we asked Marge, our telephone operator, to tell us which of our editors receives the greatest number of telephone calls . . . business calls, that is . . . during the normal working day.

"Why Mr. Morgan, of course," she answered with a toss of her pretty head.

"Mr. Morgan, eh?" we mused. "And how many calls might that be on the average?"

"Maybe 25 to 30 a day", she answered.

That was enough for us. Any guy able to stand that many phone bells ringing in his ears all day deserved to have the world know about it . . . so we went to see John Morgan, assistant managing editor of STEEL.

Found him hiding behind a pile of mail that would have done credit to Marilyn Monroe. Just for fun, we kidded him into letting us stack it up piece on piece. Then, we pulled out our expandable rule (just happened to have one with us) and reeled out two feet of it before it reached from the desk top to the top of the pile. That, Dear Reader, is mucho mail . . . and Morgan burrows through a stack just like it every day.

Now, let's wrap all this mail and a bundle of 25 to 30 telephone calls (one every 18 minutes) in a streamer of telegraph and teletype messages about ten feet long and you begin to get the picture of the daily routine load Morgan picks up each morning when he reports for desk duty.

John Morgan is well known to most STEEL readers. They follow his weekly Metalworking Outlook reports and are also familiar with his deft handling of major news stories.

Morgan is also the originator and author of those "My Day" interviews which STEEL has carried in recent months.

He has a knack for coming up with the "just right" touch in the preparation and presentation of metalworking news stories. And thanks to this newsman's sixth sense and a happy faculty for being able to transmit his ideas to others, John makes news story assignments. That he also takes on quite a few of those assignments himself is witnessed by the fact that he traveled well over 10,000 miles during 1952 searching out facts to build into stories.

Morgan came to STEEL approximately seven years ago from a position in the Advertising and Public Relations Departments of the White Motor Co. Previous to this, he attended Yale University and later tucked some graduate work from Western Reserve University under his academic belt.

John is married and daughter Penny, age 5, is the light of his life. Likes to collect records, too, with Benny Goodman and George Shearing being his particular favorites.

John Morgan is as original as the "stand-up meetings" he calls when a hot story is in the works and as steady and purposeful as the daily calendar upon which he notes his schedule of stories. Yep, here's a guy who really gives you plenty of quantity along with the quality.

Shrdlu's Glossary

Perhaps you get as confused as we do on occasion by some of the terms tossed around your office from time to time, all pointed so they say toward greater business efficiency. Well . . . we doubt it just enough that we'd like to air a few of them and maybe you have a few more you'd like to add:

A Program—Any assignment that can't be completed by one telephone call.

To Expedite—To confound confusion with commotion.

Channels—The trail left by inter-office memos.

Coordinator—The guy who has a desk between two expediters.

Consultant—Any ordinary guy more than 50 miles from home.

To Activate—To make carbons and add more names to the memo.

To Implement a Program—Hire more people and expand the office.

Shrdlu

(Metalworking Outlook—Page 55)

Wellman will build it

Special Cranes
Ore Bridges
Gas Producer Plants
Charging Machines
Car Dumpers
Gas Flue Systems
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Coke Pushers
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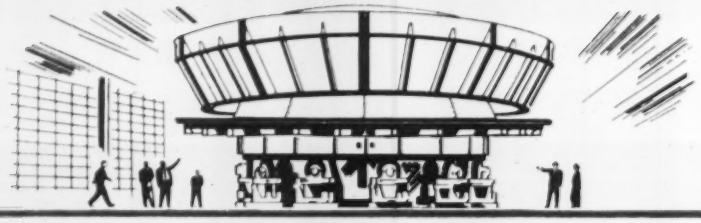


POLLOCK

chosen to construct latest sintering plant equipment

McKee 16
Wind Box
Sintering Machine

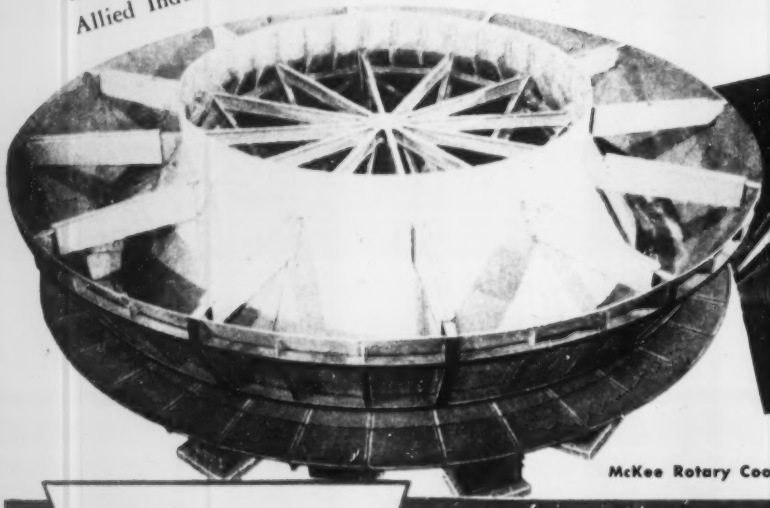
POLLOCK ALSO MAKES . . .

Miscellaneous Welded and Riveted Steel Plate Work for Blast Furnaces and Steel Plants, Oil Refineries, Chemical Plants and Allied Industries.

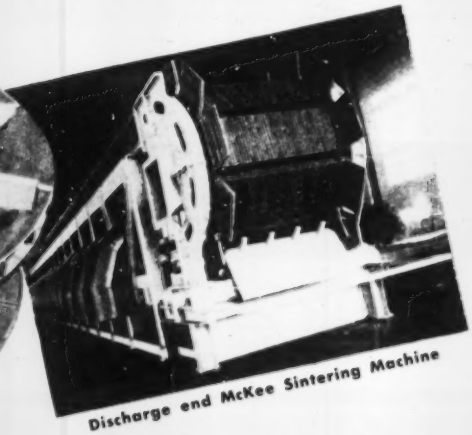
TO construct its newly developed sintering plant equipment, Cleveland's Arthur G. McKee Company chose The William B. Pollock Company, steel plate construction experts since 1863.

This latest sintering machine and rotary cooler were assembled in Pollock's Youngstown, Ohio plant and inspected by the customer and many interested iron and steel operators and engineers while in test operation. Then it was thoroughly match-marked, disassembled, and loaded on 16 railroad cars in such a way as to insure quick and efficient field erection.

Pollock is known the world over for its reliable, efficient heavy plate construction.



McKee Rotary Cooler 48 Ft. 4 In. Diameter



Discharge end McKee Sintering Machine

POLLOCK

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HOBART

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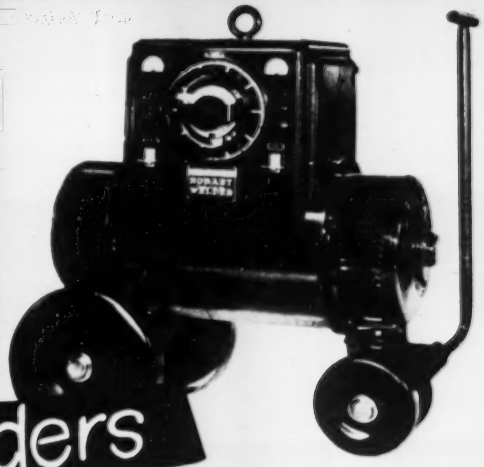
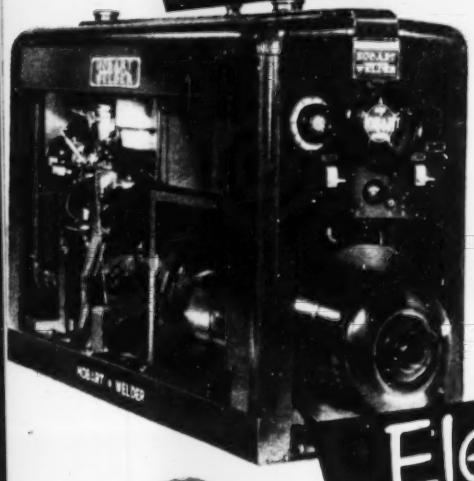
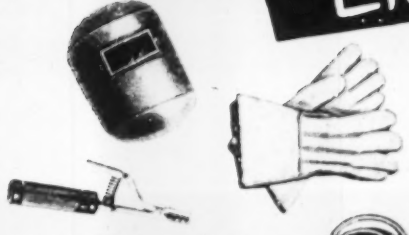


Arc Welders



Hobart's advanced engineering and rugged, heavy duty construction assure top welding performance, trouble free service and long life under the most severe welding conditions. Hobart puts more quality in — that's why you consistently get more welding out of them. If there is any doubt, check Hobart point-for-point — against any other welder — or better still, just check any owner. Available in either gas engine or electric models. Use coupon for details.

Electrodes



Whatever your welding problem may be, there's a Hobart Electrode that is faster — gives less splatter — is easier to use than any electrode you may have tried. A type and size for every need. A trial is all you'll need to switch to Hobart. Hobart Accessories for every welding need. They do a better job — last longer. Tried and tested under actual usage. Check coupon for full details.

Accessories

---------- *Clip Coupon and Mail TODAY!* ----------

HOBART BROTHERS CO., BOX ST-43, TROY, OHIO

Without obligation, send me information on items checked below.

☐ Gas Drive Welder ☐ Electric Drive Welder ☐ Pipeliner Welder

Send me ☐ WELDER CATALOG ☐ ELECTRODE CATALOG ☐ ACCESSORY CATALOG

NAME _____ POSITION _____

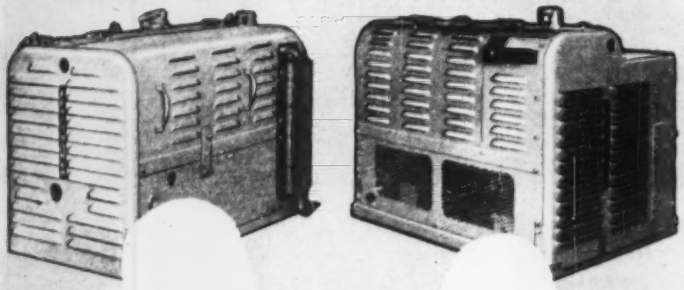
FIRM _____

ADDRESS _____

FREE . . . Check here for booklet "How to get better Welds"

READY-POWER

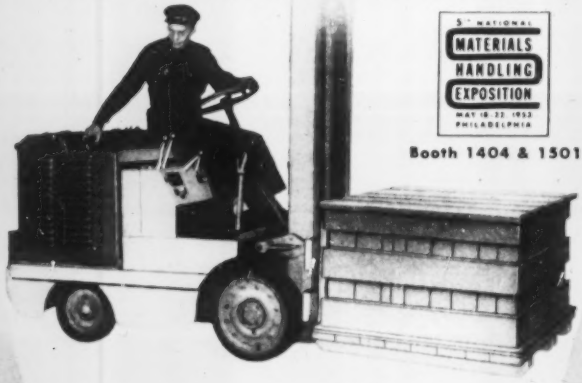
GAS-ELECTRIC **DIESEL-ELECTRIC**



Now... 2 Types of Continuous-Duty Power Units

FOR ALL ELECTRIC TRUCKS

Now you can select either gas-electric or Diesel-electric Ready-Power for any size or make of electric truck. GAS-ELECTRIC Models are for the tough materials handling jobs . . . DIESEL-ELECTRIC Models master the "impossible" jobs that keep trucks going day and nite, year after year. Ready-Power continuous-duty drive operates electric trucks at the lowest known costs per ton mile! Write us for additional information.



5th NATIONAL MATERIALS HANDLING EXPOSITION MAY 18-22, 1953 PHILADELPHIA

Booth 1404 & 1501

The READY-POWER Co., 3824 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units, Gas and Diesel-Electric Power Units for Industrial Trucks

LETTERS
TO THE EDITORS

Handbook Valuable to Industry

I want to thank you very much for sending me a copy of the Specifications Handbook, published by STEEL. I believe the industry owes your magazine a vote of thanks for the excellent job of coordinating all these various specifications. I am sure I will treasure my copy.

P. H. Carlson
Babcock & Wilcox Co.
Tubular Products Division
Beaver Falls, Pa.

I am very thankful to have received your Specifications Handbook. It not only becomes a valuable reference book but also a reminder that STEEL is serving their subscribers with information and data beyond that contained in the weekly issues.

William E. Bossert
district sales manager
Alan Wood Steel Co.
Conshohocken, Pa.

I wish to thank you most appreciatively for my copy of STEEL's Specifications Handbook. It is certainly more than I expected when I wrote to get a copy.

Past experience, coupled with your complete chemical analyses, enables one to transfer information into machinability and is, therefore, of great value not only to myself but to the metal cutting industry.

Maynard L. Tirrell
Engineering Department
Threadwell Tap & Die Co.
Greenfield, Mass.

Forming Stainless Steel

We read with interest your article "New Stainless Stretches Nickel" (Mar. 9, p. 94), primarily because of the illustration of the forming of stainless steel as done by the Budd Co.

Robertson Q panels are sometimes sold with an exterior skin of Type 430 stainless steel. Forming the exterior section from stainless steel has presented a lubrication problem we have not yet solved. The exterior side of the panel is of open box type construction, having right angles at each bend. Lubricants have not successfully prevented scoring of the stainless steel or picking up of the sheets by the rolls. Because we have not found a lubricant that works, we buy sheets with paper pasted to each side. The paper has prevented scoring.

Please turn to page 12

Acme Steel Strapping Insures S.A. *(Safe Arrival)*

Secures tractor parts for long-distance hauling . . . saves time and trouble for International Harvester

STRAPPING ON A TRACTOR. When International Harvester ships crawler tractors on open railroad flatcars, Acme Steel Strapping ties tool boxes, lubrication equipment and seat cushions in place for the journey.

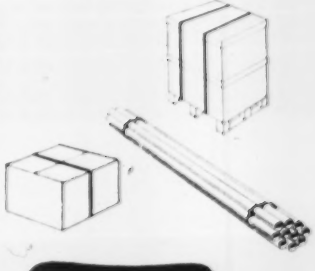
SOLE SUPPORT for these IH Diesel engines is one Acme Steelstrap per engine. It secures the engine to a pallet for easy handling.

4,000 POUNDS of tractor dashboards are bundled together with Acme Steel Strapping for delivery from one International Harvester plant to another.

Whenever you receive anything secured with Acme Steel Strapping, you know that the shipper has taken care to get it to you safe. He has also beat the threat of damage-in-transit and has cut the cost of packing and shipping, too.

Acme Steel Strapping does all these things. It makes packing and loading easier and faster. It provides better protection during shipment, and helps insure S.A. (Safe Arrival).

Almost certainly, Acme Steel Strapping or Acme Steel Stitching Wire methods can help somewhere in *your* operation. If you have any kind of a shipping or materials-handling problem, we may have just the idea you need. Write Acme Steel Products Division, Dept. S-43, ACME STEEL COMPANY, 2840 Archer Avenue, Chicago 8, Illinois.



ACME STEEL

STRAP IT . . . STITCH IT . . . SHIP IT . . . SAFELY!

At the Touch of a Button

...FASTER HANDLING, LOWER COST

● Here's how a typical plant turned a slow, costly handling job into a simple push-button operation. Consider the savings you might get in time, money and manpower by following a similar step.

The job was to remove wire from winding drums and convey it to the next operation. To reduce costs, a new idea was tried: a ½-ton, single I-BEAM READING ELECTRIC CRANE was custom-built for the job. All motions were motorized. Now one man controls the entire operation faster and more economically—by simply pushing the right button!

If you, too, are looking for a way to speed up your own materials handling, and save money doing it, here's the step that can pay off for you. Simply get in touch with READING. At no obligation, one of our engineers will gladly analyze your handling requirements and give you a practical recommendation for obtaining the results you want. A note on your letterhead will put him to work.

Reading Crane & Hoist Corporation, 2102 Adams Street, Reading, Pa.

READING CRANES

CHAIN HOISTS · OVERHEAD TRAVELING CRANES · ELECTRIC HOISTS

LETTERS

Concluded from page 10

but removing it after forming presents another problem.

Whom could we contact at the Budd Co. for information on the lubricant they use in forming their corrugated stainless sheets?

H. E. Kennedy
H. H. Robertson Co.
Ambridge, Pa.

● *Write to Dr. Joseph Winlock, chief metallurgist, Budd Co., Philadelphia.—ED.*

The Blast Furnace Reappraised

I have just read Charles E. Agnew's article "Don't Write Off the Blast Furnace" (Mar. 16, p. 110). We would like very much to obtain this complete article and are enclosing a letter addressed to the author which we trust you will kindly forward to him. We do not see any notification that you will have available any reprints of this article. But if you happen to have them, we would be very glad to have you supply them.

J. R. Russell
Kaiser Engineers
Division of Henry J. Kaiser Co.
Oakland, Calif.

● *We have forwarded your letter to Mr. Charles E. Agnew, 17628 Winslow Rd., Shaker Heights 20, O. We are also setting aside three sets of tear sheets of Mr. Agnew's articles which will appear in four installments. Upon completion of their publication, we will mail them to you.—ED.*

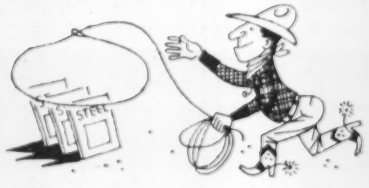
Sheet Steel Producers Wanted

I am interested in obtaining a list of all prime producers of cold and hot-rolled sheet steel including the existing hand mills. Will you please advise me if such a list is available either as part of a publication or a separate list.

Harold R. Bevan
Orley Brothers Co. Inc.
Detroit

● *We believe you can get your answer by referring to the market price pages of any issue of* STEEL *or from the "Guide for Steel Buyers" which appeared as a 48-page special section of the Jan. 15, 1951, issue of* STEEL.*—ED.*

Roundup Time for Tear Sheets



We will appreciate your sending us tear sheets of the following articles which we believe may be helpful to us in our work:

Tube Packaging (Sept. 8, p. 184)

Wrap Up Savings in Scientific Packaging (Oct. 6, p. 57)

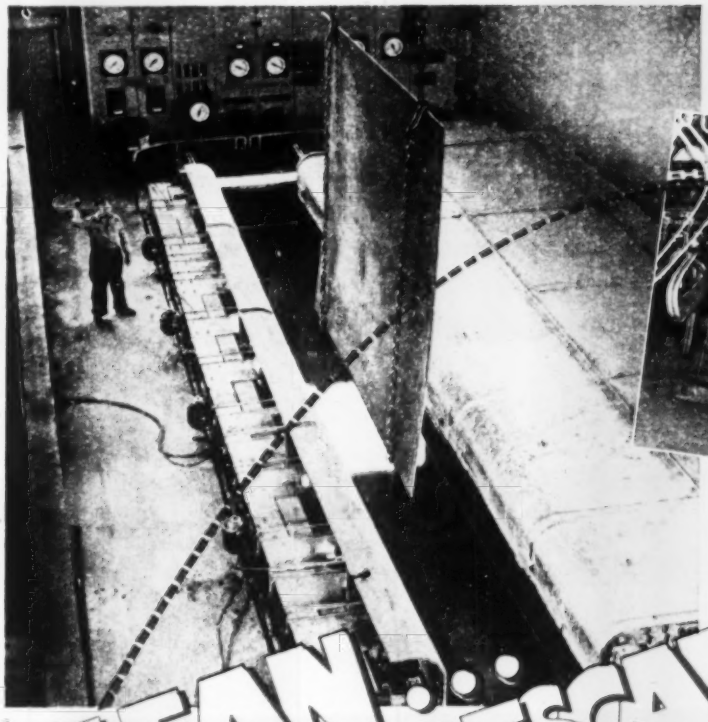
Ultrasonic Cleaning Pays Off for Small Parts (Nov. 3, p. 92)

Drawing Dimensions in Their Place (Aug. 25, p. 115)

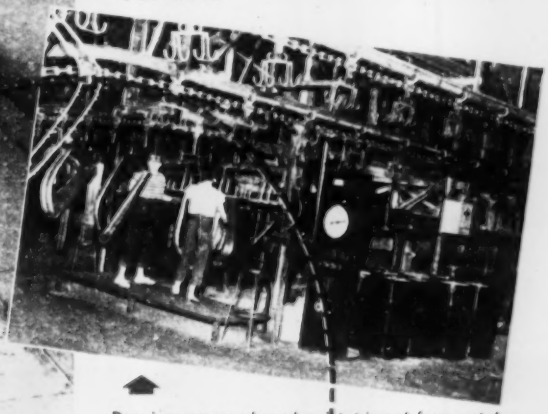
How an Inventor and Engineer Operates (Nov. 10, p. 79)

Packaging Systems Need Change (Aug. 25, p. 91)

D. M. Florence
Cherry-Burrell Corp.
Chicago



Stainless, carbon, alloy and high-speed tool steels and non-ferrous alloys descaled in from 15 seconds to 20 minutes.



Drawing compounds and paint stripped from metal stampings in 50 seconds.

CLEAN... DESCALE... DESAND

...faster, better at appreciably less cost

From removing metallic oxide scale from huge plates, coils or bars to desanding molds or cleaning residual materials from stampings, the Ajax Electric Salt Bath Furnace paves the way to appreciable savings in labor, floor space and time. What's more, the work is done far more efficiently than is possible with sand-blasting, acid pickling, electrolytic anodic cleaning or other methods.

The Ajax Salt Bath Furnace is adaptable to many metal and alloy types. Different metals and different metal shapes can be descaled simultaneously. The bath acts uniformly on all parts of the work including blind holes. The process reacts only on scale, sand or residual materials. The base metal is not affected and there is no hydrogen embrittlement. First cost of the equipment is low and so is upkeep. Pot and electrode life is measured in years and the bath can be regenerated indefinitely by the addition of low cost chemicals. Where desired, the entire process can be mechanized for highly efficient mass production.

Write today, giving details of your finishing problem. Let Ajax engineers prove these claims — at not the slightest obligation. Reprinted technical articles on cleaning, descaling and desanding are available on request.

Grease, drawing compounds, residual rubber, carbon black, plastics, paint and enamel removed in minutes with less labor.

Residual sand removed from these pump castings by 3-minute salt bath immersion at 700°F

AJAX ELECTRIC COMPANY, INC.

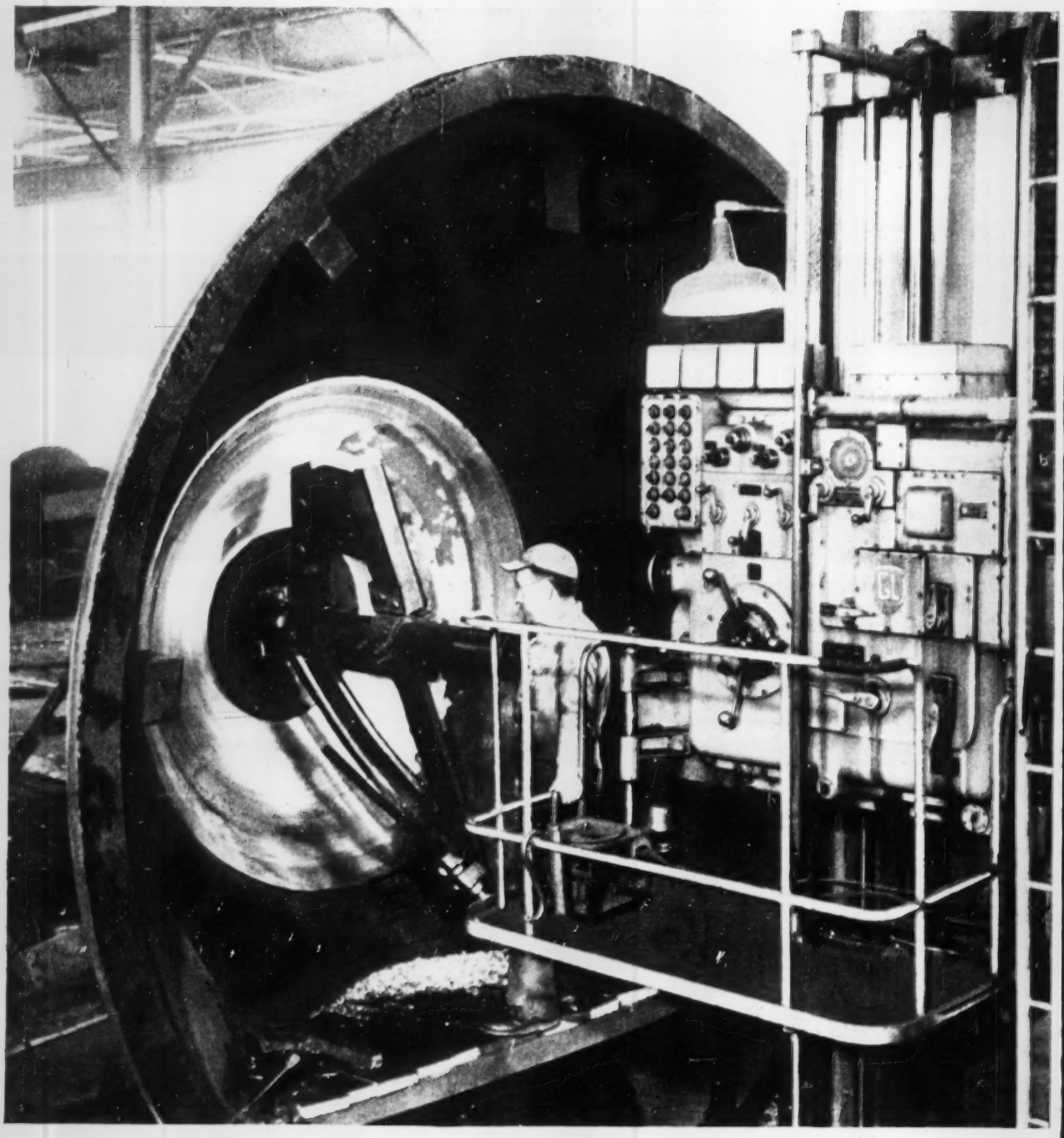
WORLD'S LARGEST MANUFACTURER OF ELECTRIC HEAT TREATING FURNACES EXCLUSIVELY

952 Frankford Ave. Philadelphia 23, Pa.

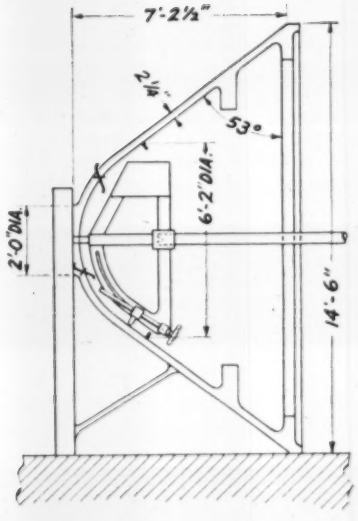
Associate companies: AJAX ELECTRIC FURNACE CORP.; AJAX ENGINEERING CORP.; AJAX ELECTROTHERMIC CORP.

AJAX ELECTRIC SALT BATH FURNACES

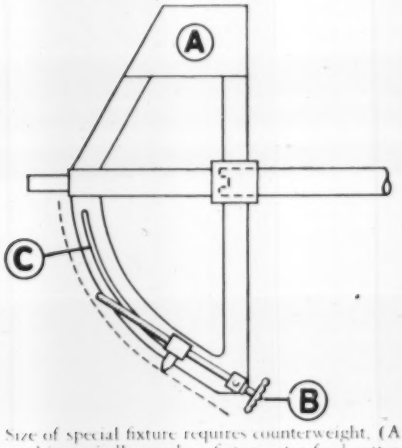
How would you finish in a 14½′ x 14½′ x 7¼′



a spherical radius cast steel workpiece?



Casting is set up on edge, and 8" I-beam tripod welded to support it. Jacks are used at outer rim for bracing . . . stops are set in floor plate to provide additional rigidity. Special fixture on machine spindle revolves inside casting.



Size of special fixture requires counterweight, (A). As machine spindle revolves fixture, star feed cutter (B), and holder in travel in machine slot in fixture (C) . . . controlled path generates the spherical radius. As operation proceeds toward center of bell, it is necessary to change the length of the actuating screw to avoid interference with the casting.

This unusual job on a 38,000-lb. blast furnace bell is simplified by use of a G&L 560-F floor type Horizontal Boring Mill

A versatile G&L machine, relatively inexpensive tooling and ingenuity . . . here's how they provided an answer to an unusual problem.

William B. Pollock Company of Youngstown, Ohio, took full advantage of the G&L floor type's open construction and excellent versatility.

First of all, they designed a somewhat unusual setup. The circular rough finished casting is set on edge facing the machine's main spindle. Eight-inch I-beams welded to the casting's top and extending to the floor act as braces. Jacks and stops are also used to keep the bell rigid.

After a $2\frac{3}{4}$" pilot hole is drilled and bored through the center of the top of the bell, a hardened bushing is inserted. This bushing serves as a pilot for the extension of the special fixture. The latter (see illus. lower right), is essentially a star feed tool with the tool holder traveling in a machined slot in the fixture. Its movement controls the path of the tool and generates the spherical radius. Stock removal varies from $\frac{1}{4}$" to $1\frac{1}{2}$", depending on the concentricity of the rough casting.

In the photo, you will note the large unfinished portion in the center of the casting. It will be finished after the larger diameter has been finished to depth. This is done to remove surface imperfections such as the one appearing above the operator's head in the photo. To complete the job it's necessary to use a longer actuating screw to push the tool around to that part of the cam track.

If you, like William B. Pollock Co., face unusual production problems, call in your G&L representative. He'll be pleased to help you solve them . . . tell you how you can take advantage of the 5-point G&L analysis service. BUT DON'T DELAY . . . DELIVERY ON G&L MACHINES MAY BE BETTER THAN YOU THINK.

GIDDINGS & LEWIS MACHINE TOOL CO.
Fond Du Lac, Wisconsin, U. S. A.

Builders of the world's finest Horizontal Boring, Drilling and Milling Machines — table, floor and planer types: Hypro Planers, Planer Type Milling Machines and Vertical Boring Mills; and G&L machine tool accessories.

G&L DAVIS HYPRO

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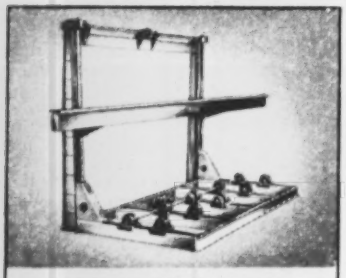
REED
ENGINEERING CO.

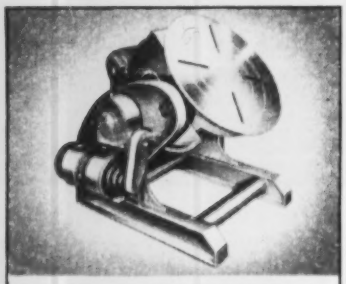
Modern
Metalworking
Equipment

- BENDING ROLLS
- TURNING ROLLS
- AUTOMATIC WELDING FIXTURES



UNIT TYPE AUTOMATIC WELDING TURNING ROLLS

- ★ Combines adjustable track support and turning rolls into one fixture
- ★ In 5 standard models
- ★ Capacities up to 9 tons, 12 ft. diameters
- ★ Vertical and horizontal powered track adjustment on larger models



REED WELDING POSITIONER

- ★ Machined face with cast-in "T" slots
- ★ Machine Tool accuracy
- ★ 10-to-1 speed variation
- ★ Ball bearing work table mounting
- ★ 1000, 2500 lb. models, hand or power tilting
- ★ Rotating ground connection

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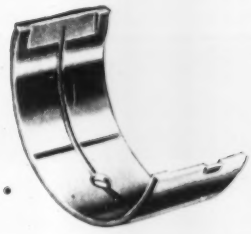
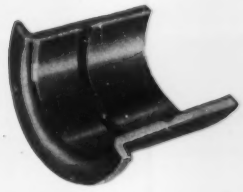
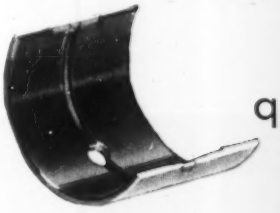
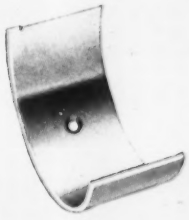
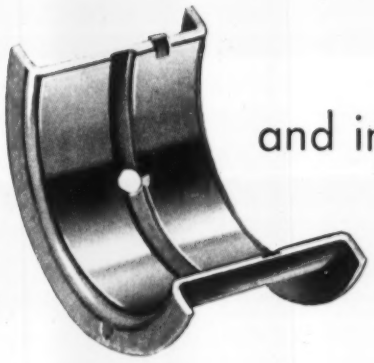
Sleeve bearings . . .  more than 50 years specialized experience. Research, design,  quality control,  quantity production. Widest range of sizes and lining alloys  on bronze or steel backs. Complete engineering service. Long or short runs for automotive  and industrial requirements.

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Sleeve bearings in all designs and sizes • Cast bronze bushings • Rolled split-type bushings Bimetal rolled bushings Washers • Spacer tubes • Precision bronze parts • Bronze bars

FEDERAL Mogul SINCE 1889

FEDERAL-MOGUL

Problem...

GETTING GREATER FLEXIBILITY, MAXIMUM UTILIZATION OF SCARCE STEEL WITH SMALLER INVENTORIES . . . .

Industrial building corridor shows the variety of panel widths required. Note ripple-free flatness of panels. Hauserman can cut these from one width of coil stock.

Neat, trim business office of Hauserman panels. Note clean window lines and wainscoting. Hauserman now can produce any necessary width from wide coils, eliminating heavy steel inventories.

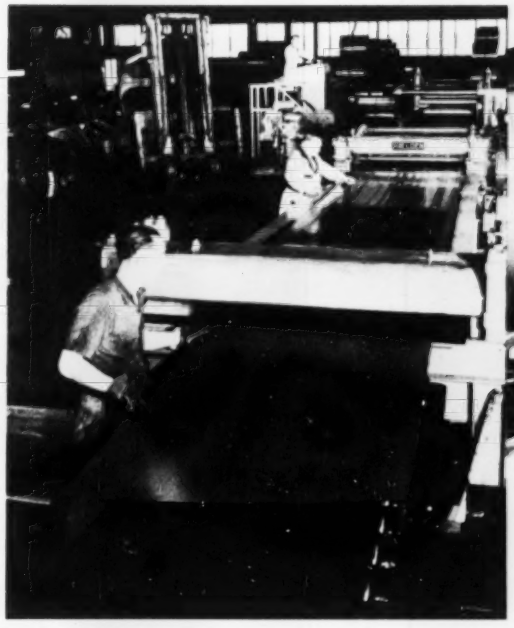
The E. F. Hauserman Company, Cleveland, Ohio, is the world's largest manufacturer of movable steel partitions and wainscot panels. Their operation demanded flat steel of innumerable dimensions, trimmed and leveled to precision flatness. As the sheets came from the steel mills they were stretcher leveled to commercial tolerances, or a buckle of not over ¼" high. But in the manufacturing of Hauserman partitions, they insisted on the maximum tolerance of 1/16", or practically dead flat.

The steel mills had met Hauserman's flatness requirements, but it was costly for them as well as Hauserman. Steel producers encouraged Hauserman to look into the possibilities of providing their own leveling facilities.

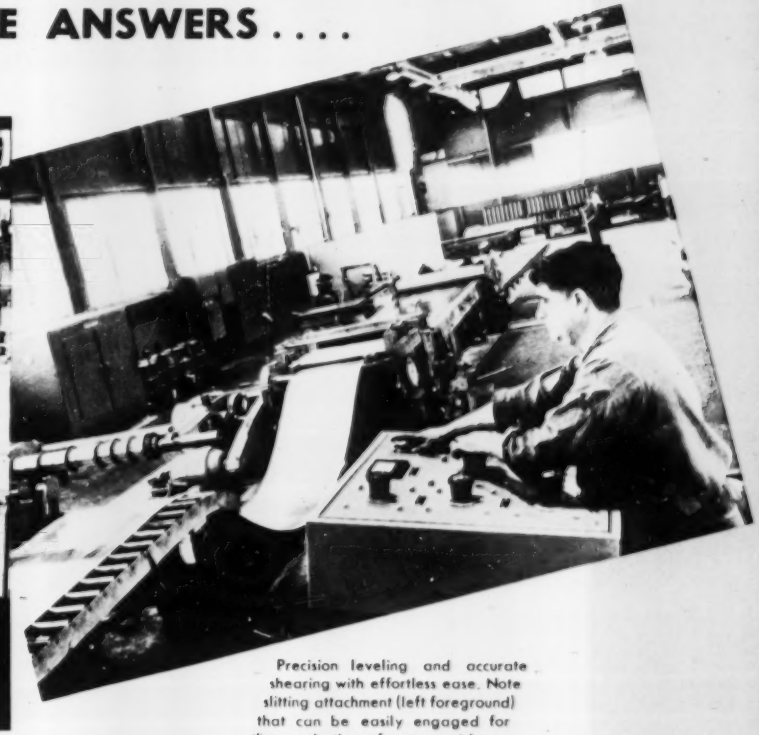
Add to this the fact that Hauserman's operations required sheets of many sizes in lengths from 3 to 12 feet and widths from 1 to 5 feet. In using mill sheets Hauserman had either to stockpile multiple lengths and widths to obtain a flexible inventory or to stock larger sized sheets and trim them as they were needed — which resulted in unnecessary waste.

Solution...

WEAN COMBINED SLITTING, SHEARING AND LEVELING SET-UP FOR MANUFACTURING PLANTS PROVIDES THE ANSWERS....



Receiving end of Wean shear line shows compact, easily maintained arrangement. Elevated control stand permits full view of all operations.



Precision leveling and accurate shearing with effortless ease. Note slitting attachment (left foreground) that can be easily engaged for the production of narrow strip.

Encouraged by basic steel producers Hauserman engineers decided to do their own slitting, shearing and leveling. Working with Wean Equipment Corporation's engineers a complete operation was designed and built that enables Hauserman to buy commercial coil stock in a minimum of widths, shear to desired dimensions, level as required — to maintain complete stocks with a minimum inventory.

The first station on the Wean line is an uncoiler from which the stock passes into a gang slitter where it is edge trimmed and slit to desired widths. The steel may then be recoiled and stored. When sheets are desired, the stock by-passes the recoiler and enters the flying shear to be cut in sheet lengths. Semi-automatic roller conveyors enable Hauserman to move the steel to storage or to send it through the leveling section of the line where the roller leveler actually delivers improved flatness over the stretcher leveled stock formerly used.

THE ANSWER IS RESULTS . . .

Wean maintains perhaps the most experienced staff of special machinery and equipment engineers and construction craftsmen in the nation.

Whatever your special machinery problem, your engineers can have this result-getting combination by contacting Wean Equipment Corp., 22800 Lakeland Boulevard, Cleveland, Ohio.

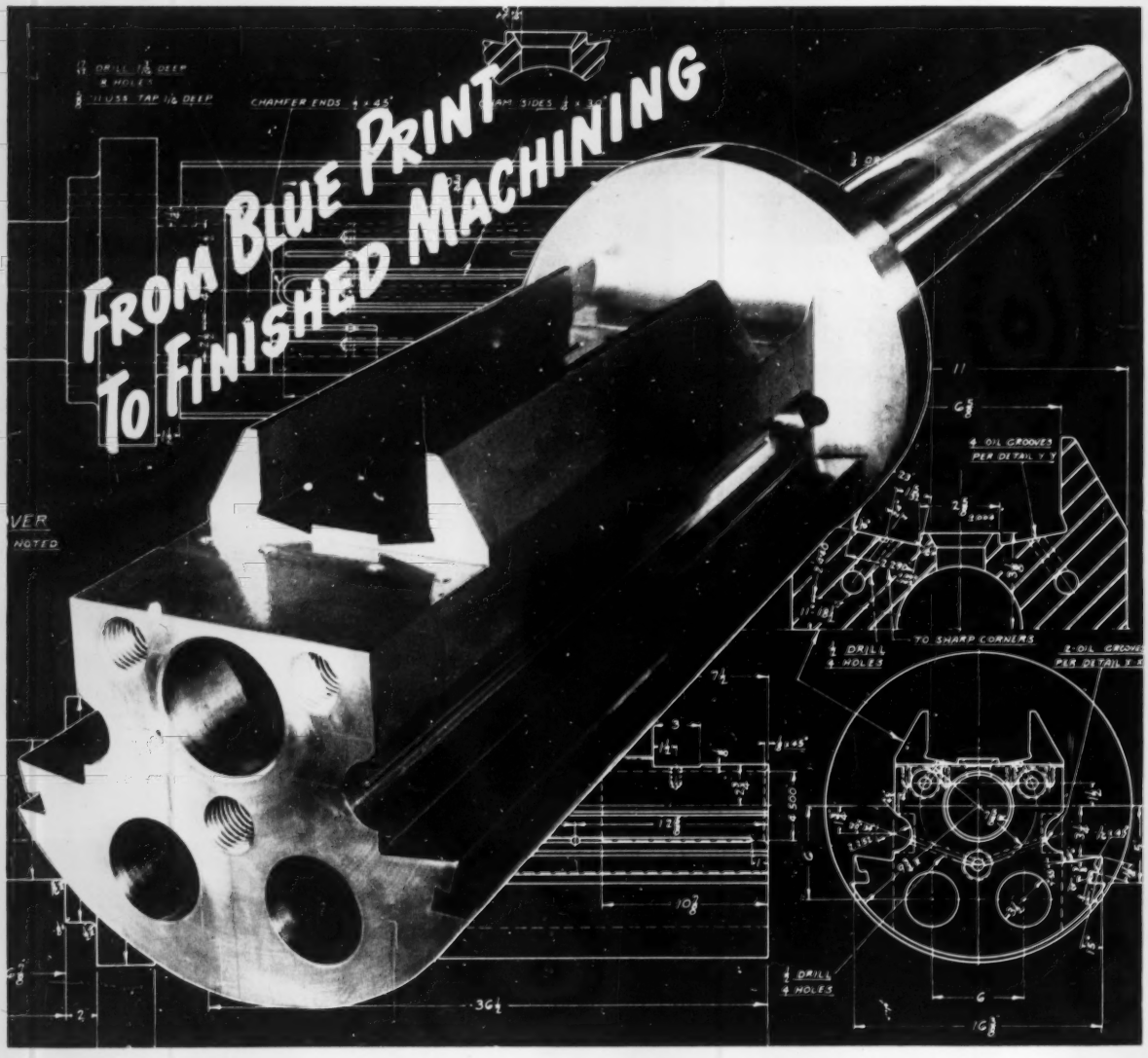
MACHINERY TODAY IS THE BUSINESS OF THE

EQUIPMENT CORPORATION

Wean

Detroit, Michigan
Chicago, Illinois
Newark, New Jersey

Cable: Weancor **Cleveland, Ohio**



This Block Body for a Tension Reel represents the coordinated effort of many National Forge skills in turning out the required electric alloy steel, the proper heat treating and the intricate machining to exacting tolerances.

National Forge offers you complete forging service in one plant—under one responsibility.

Why not take advantage of this "all-in-one" service the next time you need forgings?

For full information, write NATIONAL FORGE AND ORDNANCE COMPANY, Irvine, Warren County, Pennsylvania.

NATIONAL FORGE AND ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PENNSYLVANIA

Visit the Tycol Exhibit!
American Society of Lubrication Engineers
Hotel Statler, Boston, Mass.
April 13-15

...with TYCOL lubricants on hand!

Take metal fabrication, for example. There's a Tycol lubricant for any application you can name: For instance, what about tough machining jobs? . . . Tycol Afton cutting oil keeps cutting edges cool . . . lengthens tool life between grinds. Machine tool hydraulic systems? . . . Tycol Aturbrio oxidation and rust inhibited oils keep them running smoothly. Open gears of metal forming equipment? . . . Tycol Amaclac lubricants cling like cat hair on a serge suit. You always get top performance with Tycol lubricants. Why? . . . Because each Tycol grease and oil is manufactured from high quality base stocks and *tailored* for a specific application. Get the full story of the entire Tycol line from your local Tide Water Associated office today!

Over 300 Tycol industrial lubricants are at your disposal . . . engineered to fit the job!

REFINERS AND MARKETERS OF VEEDOL . . . THE WORLD'S MOST FAMOUS MOTOR OIL

TYCOL
INDUSTRIAL LUBRICANTS

Boston • Charlotte, N. C. • Pittsburgh
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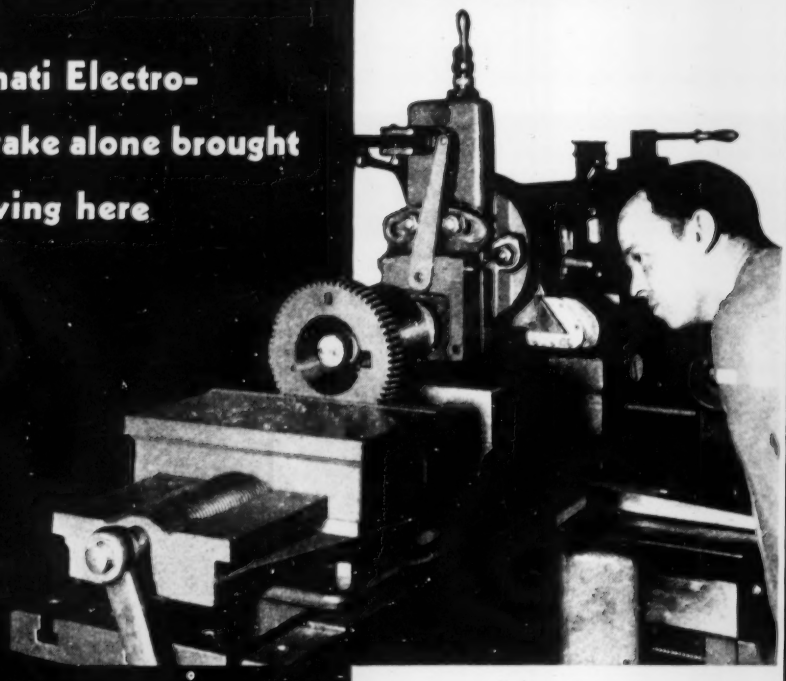
TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE · NEW YORK 4, N. Y.

Outstanding Time Saver...

The New Cincinnati Electro-Magnetic Clutch and Brake alone brought a 30% time-saving here



The New Cincinnati Magnetic Clutch and Brake, with its single, convenient control lever, gives the operator the fastest, simplest and most accurate control of his Shaper and converts waste time into productive time.

This powerful clutch and brake requires no adjustment, and has a long, maintenance-free life.

Write for Cincinnati Shaper Catalog N-5.

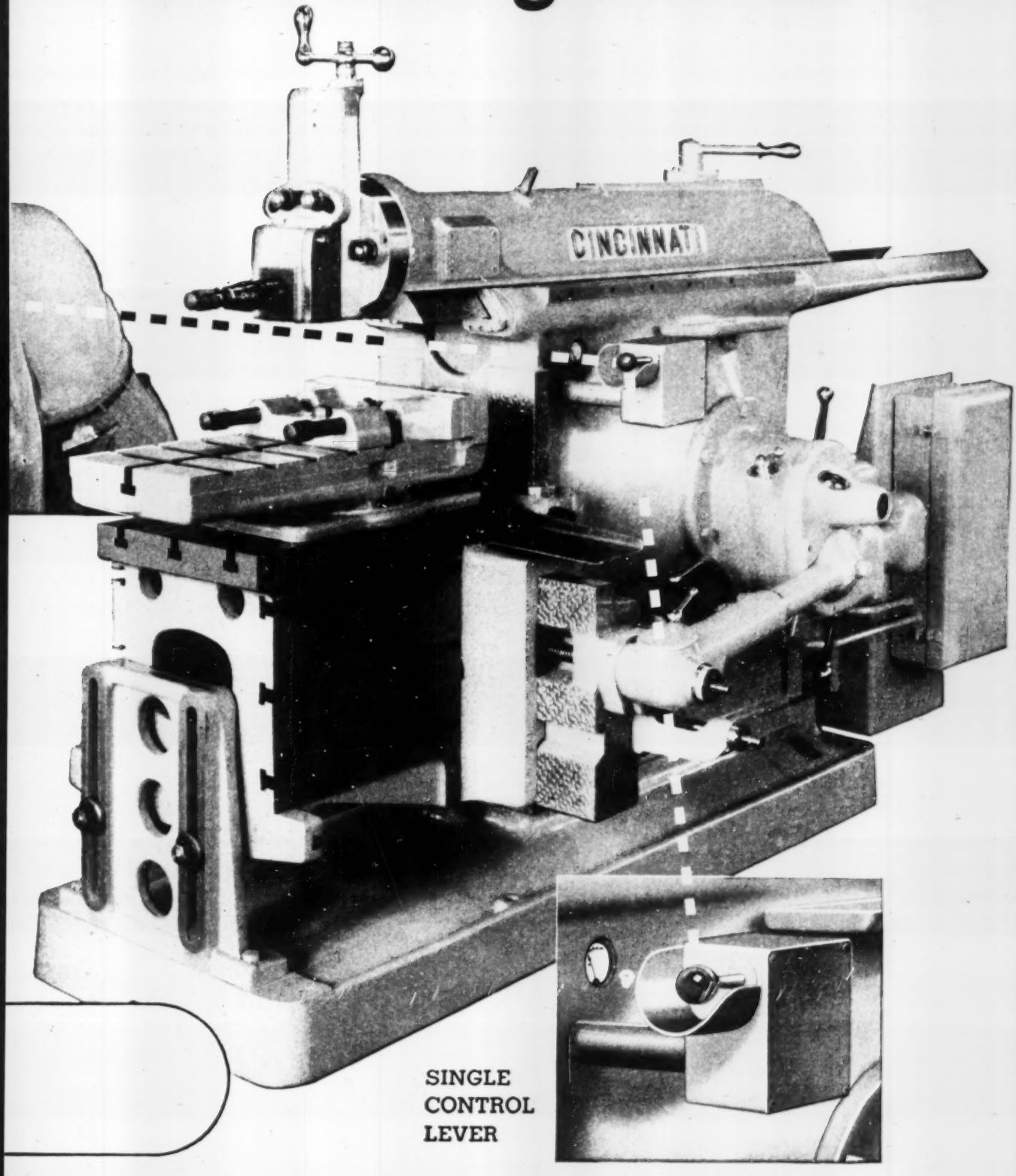
Shaping time on 7 internal oil grooves in these steel sleeves was reduced from 12.5 minutes to 8 minutes, by the Cincinnati Electro-Magnetic Clutch and Brake.

CINCINNATI

THE CINCINNATI SHAPER CO.

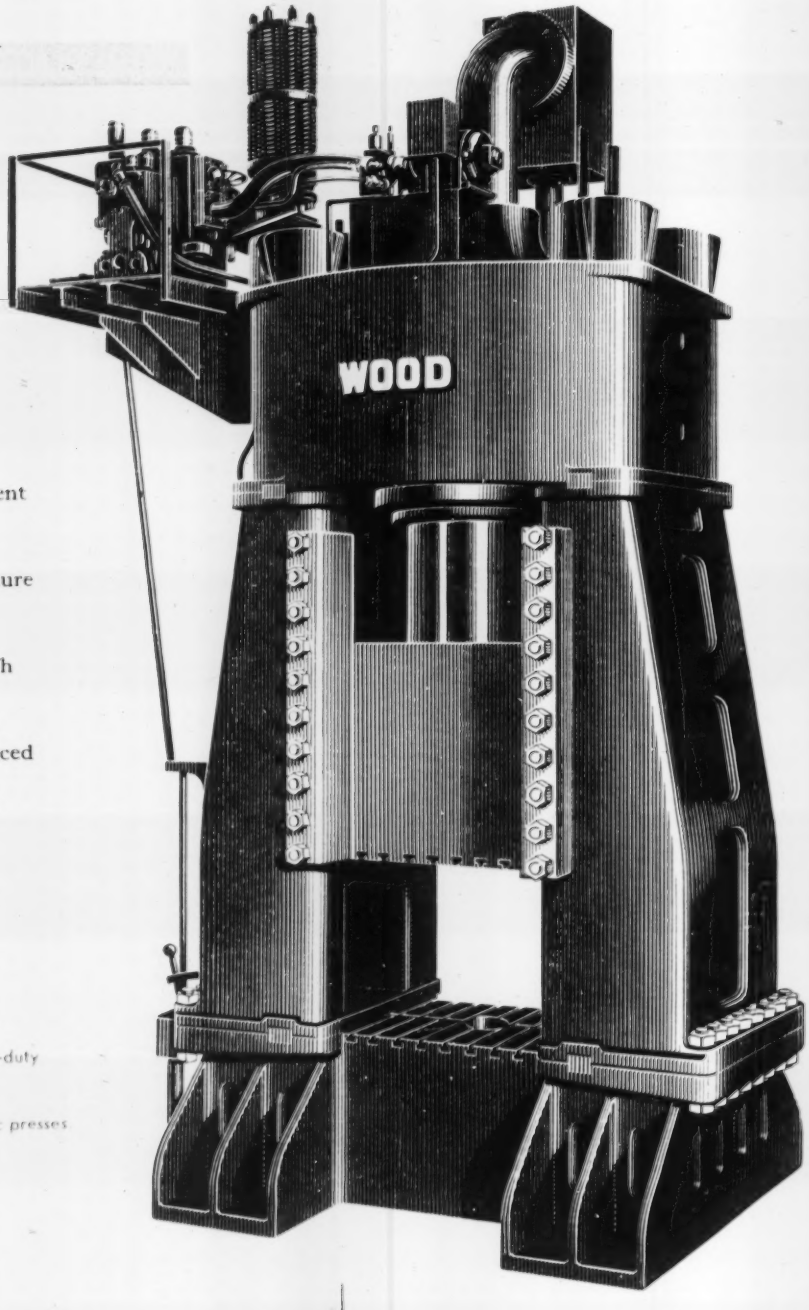
CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

....Outstanding ACCURACY



SINGLE
CONTROL
LEVER

R.D. Wood Hydraulic Presses



"... that industrial equipment
which has maintained
high excellence in manufacture
will continue to be sold,
and will contribute its worth
to uplifting the general
quality of everything produced
in industrial America ..."

1,500 ton hydraulic press designed specifically for high-speed, heavy-duty die forging and ingot cogging.
Write for catalogs of our hydraulic presses

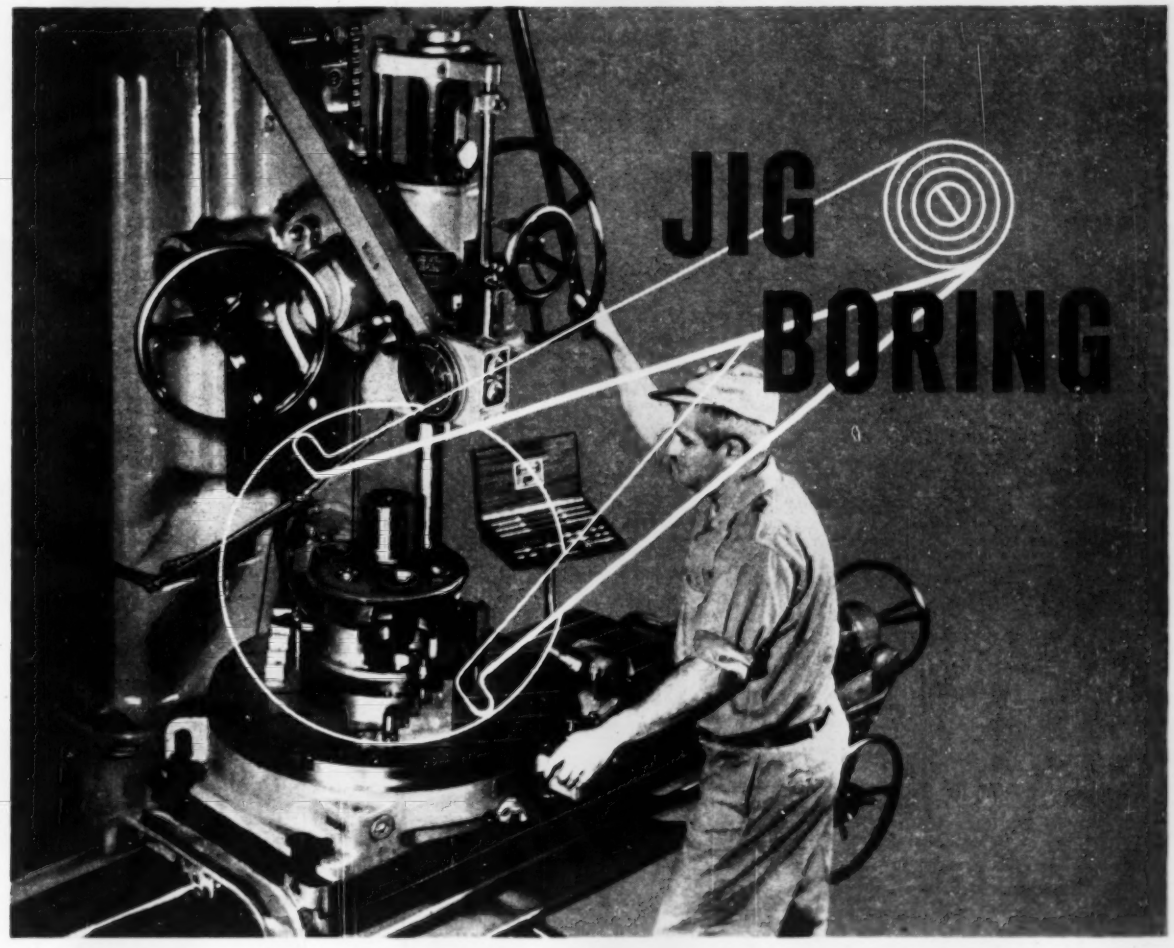
WOOD

R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING, PHILADELPHIA 5, PA.

150th anniversary

HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE • ACCUMULATORS • ALLEVIATORS • INTENSIFIERS



Mention jig boring to a craftsman machinist and he thinks instantly of "extreme" precision. And that's exactly what it is—an operation which finishes an ordinary machined surface to a micro-precision tolerance. The accuracy of jig boring is required on only a small percentage of gears, but BRAD FOOTE is in a position to produce this accuracy when required.

• Jig boring is another of the wide variety of manufacturing methods employed by BRAD FOOTE to make gears exactly right for you and each of our many other customers.

• Consider the advantages of using BRAD FOOTE gears, transmissions, and reducers on the equipment you operate . . . or on the machines you make and sell to others. Every operation on every BRAD FOOTE gear or assembly is done under close supervision. From the inception of the original design to the final finished product, *no one shares our responsibility.*

• Send us your specifications for prompt quotation. Or, tell us the job that the gears must do and we'll design them for you. We'd like to do business with you, and we think you'll like doing business with us.

BRAD FOOTE GEAR WORKS, INC.

1309 South Cicero Avenue • Cicero 50, Illinois
Bishop 2-1070 • OLympic 2-7700

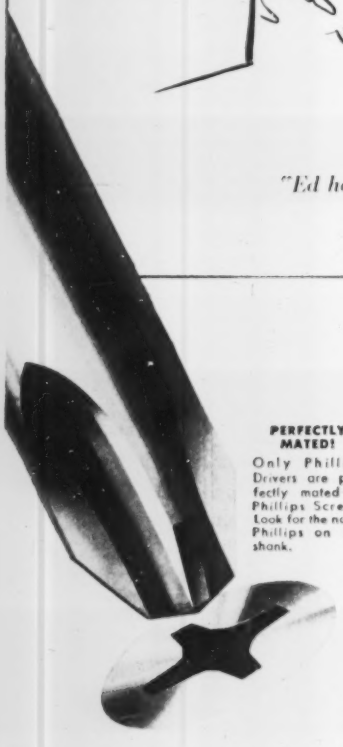
subsidiaries

AMERICAN GEAR & MFG. CO.
Phone: Lemont 920
Lemont, Illinois

PITTSBURGH GEAR COMPANY
Phone: ATlantic 1-9950
Pittsburgh 22, Pennsylvania

What's Screwy? by Phillips

"Ed has discovered that Phillips Cross-Recessed-Head Screws are definitely decorative."



PERFECTLY MATED! Only Phillips Drivers are perfectly mated to Phillips Screws. Look for the name Phillips on the shank.

DECORATIVE APPEARANCE is but one of many advantages of Phillips Screws. They cut driving time up to 50%, eliminate driver skids and split screw heads. These screws add structural strength, set up tighter, resist vibration. To save time, work, money insist on Phillips Screws — Wood, Machine, Tapping Screws or "Sems."

PHILLIPS *Cross-Recessed-Head* SCREWS

X marks the spot... the mark of extra quality

AMERICAN SCREW COMPANY • ATLANTIC SCREW WORKS, INC. • THE BLAKE & JOHNSON CO.
CENTRAL SCREW COMPANY • CONTINENTAL SCREW COMPANY • THE EAGLE LOCK COMPANY
ELCO TOOL AND SCREW CORPORATION • GREAT LAKES SCREW CORPORATION • THE H. M. HARPER CO.
THE LAMSON & SESSIONS COMPANY • NATIONAL LOCK COMPANY
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PHEOLL MANUFACTURING CO. • ROCKFORD SCREW PRODUCTS CO. • SCOVILL MANUFACTURING CO.
SHAKEPROOF DIV. OF ILLINOIS TOOL WORKS • THE SOUTHINGTON HDWE. MFG. COMPANY
STERLING BOLT COMPANY • STRONGHOLD SCREW PRODUCTS, INC. • WALES-BEECH CORP.

TODAY'S . . AND THE FUTURE'S . . . FINEST FASTENER

TO
GEAR MANUFACTURERS
Exclusively

if you have trouble meeting production schedules.

if you have trouble meeting precision tolerance specifications.

YOU should "read-up" on the HAMILTON line of Small-Gear, Precision Hobbing Machines!

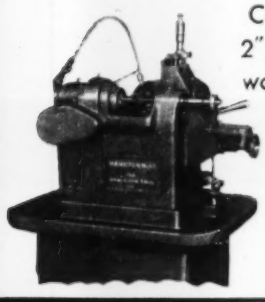
3

THREE *PRECISION* MACHINES to meet your every requirement.

HAMILTON No. 00

For the generation of spur gears and pinions only.

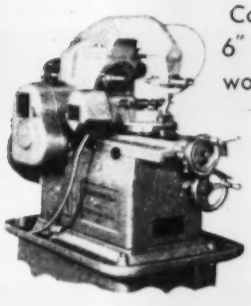
Capacity: 2" O.D. of workpiece.



HAMILTON No. 1

Hobs spur and spiral gears, worm gears and worms (to three thread), splined shafts, gear sectors, and pinions.

Capacity: 6" O.D. of workpiece.



HAMILTON No. 1-B

Generates any shape that can be made on the No. 00 or the No. 1 machines, *plus* bevel gears and face gears.

Capacity: 6" O.D. of workpiece (3" O.D. by 3/16" face, for bevel gears.)

Exclusive Greater range of hob spindle speeds: 109 to 1259 R.P.M. — 12 speeds.

Exclusive Speed, feed, indexing. *Each can be selected independently.* This, and wide range of hob speeds, adds flexibility; reduces set-up time; gives quick selection of speed and feed to suit material and gear size.

Exclusive Alignment and trueness of work and hob spindles are held to within .0002".

Exclusive Generates gears from 3 teeth to 1200 teeth.

Exclusive Accumulative error of not more than .0002" guaranteed.

THE COMPLETE STORY will be sent to you free for the asking. Request BULLETIN GH-5310 DO IT NOW!

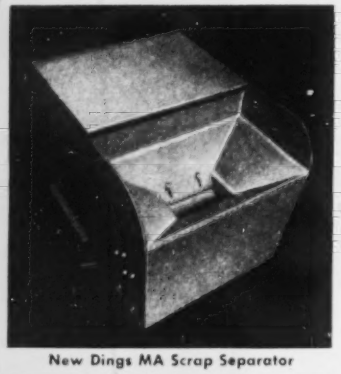
THE *Hamilton* TOOL COMPANY
1848 SO. NINTH STREET • HAMILTON • OHIO • U • S • A

Here's News

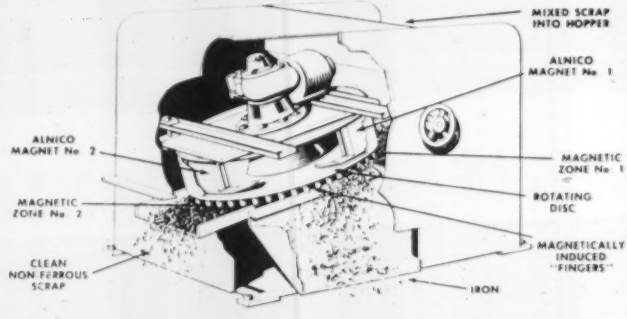
More $$$ for Non-Ferrous Scrap with—

NEW DINGS "MA" NON-ELECTRIC *DUAL ZONE* SCRAP SEPARATORS

DINGS, MILWAUKEE — You'll get more money when you get the iron out with a Dings *Dual Zone* MA — a new scrap separator that handles dry, wet, greasy, or oily flows of loosely entangled scrap with equal ease. Iron is double-trapped in the Dings MA — scrap is passed through *two* magnetic iron removal zones to doubly insure the cleanest product possible.



New Dings MA Scrap Separator



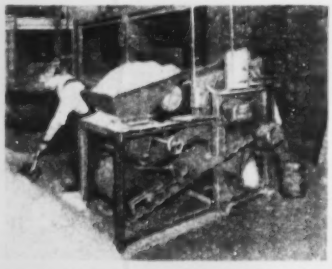
HOW IT WORKS — Mixed scrap from vibrating feeder flows down chute through two magnetic zones created by powerful, non-electric Dings Alnico Magnets. In each zone iron is picked out and discharged to the side by magnetically induced "fingers" on a rotating disc. Any iron getting through the first zone is removed in the second.

NON-ELECTRIC — You don't need generator sets or rectifiers with Dings MA Scrap Separators. Magnetic permanence of the powerful Dings Alnico Magnet is guaranteed for the life of the separator.

New Bulletin

Get the whole MA story in new bulletin B-1600-A. Write, today!

OTHER DINGS SEPARATORS



TOP — Double Magnetic Pulley Separator unit at work in one of world's largest non-ferrous metal foundries.

BOTTOM — Rugged non-electric Perma-Drum separating iron chips from red brass.

DINGS MAGNETIC SEPARATOR COMPANY

4710 W. Electric Ave., Milwaukee 46, Wis.

DINGS MAGNETS

The New Bliss Slitter...

First Choice of Another Major Manufacturer

Rugged design and rigid components are only two of the reasons why one of the nation's top automotive electrical equipment manufacturers chose the new Bliss rotary slitter for coils or sheet stock.

Look at all these features:

1. Square gearing enables slitter knives to vary in diameter, permitting cutters to be ground on the periphery; permits knife clearance adjustment to suit gauges.

2. Center bearing controls deflections of arbor where unusually severe loads are encountered.

3. Vertical adjustment of arbor is simplified by handwheel and jackscrew mechanism.

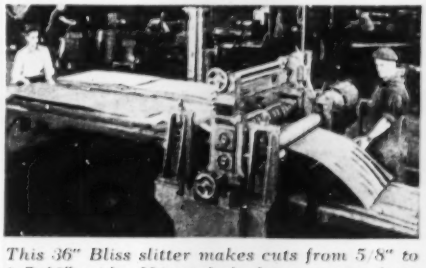
4. Entry and delivery pinch rolls are steel-mounted in anti-friction bearings and spring loaded.

5. Forged steel arbor facilitates alignment of cutter and spacer. Diameters are selected to minimize deflection.

6. Welded steel base is rigidly reinforced to support normal loads. Bliss weldments are thoroughly stress-relieved and shot-blasted.

7. Welded steel housings: Outboard housing is traversed by handwheel and screw mechanism for easy removal of arbors for re-tooling.

8. Gear reduction unit, completely enclosed, has capacity to carry full torque loads.



This 36" Bliss slitter makes cuts from 5/8" to 9-7/16" wide. Material thickness varies from 0.014" to 0.045" lamination steel and sheet insulation. Average speed is 150 fpm.

9. Drive motor, completely enclosed, is available for use with either AC or DC current.

10. Arbor bearings are either anti-friction or plain, depending on the requirements.

Make Your Next Slitter the New Bliss

Bliss offers standard slitters, complete slitting lines and accessories. Bliss slitters are reliable in operation, simple to maintain...a sure way you can save time and money by slitting your own strip. If job requirements vary from standard, Bliss engineers can design to meet your needs. Write for Bulletin 44.

E. W. Bliss Company, General Office: Canton, Ohio

ROLLING MILL DIVISION: SALEM, OHIO

E. W. Bliss (England) Ltd., Derby, England

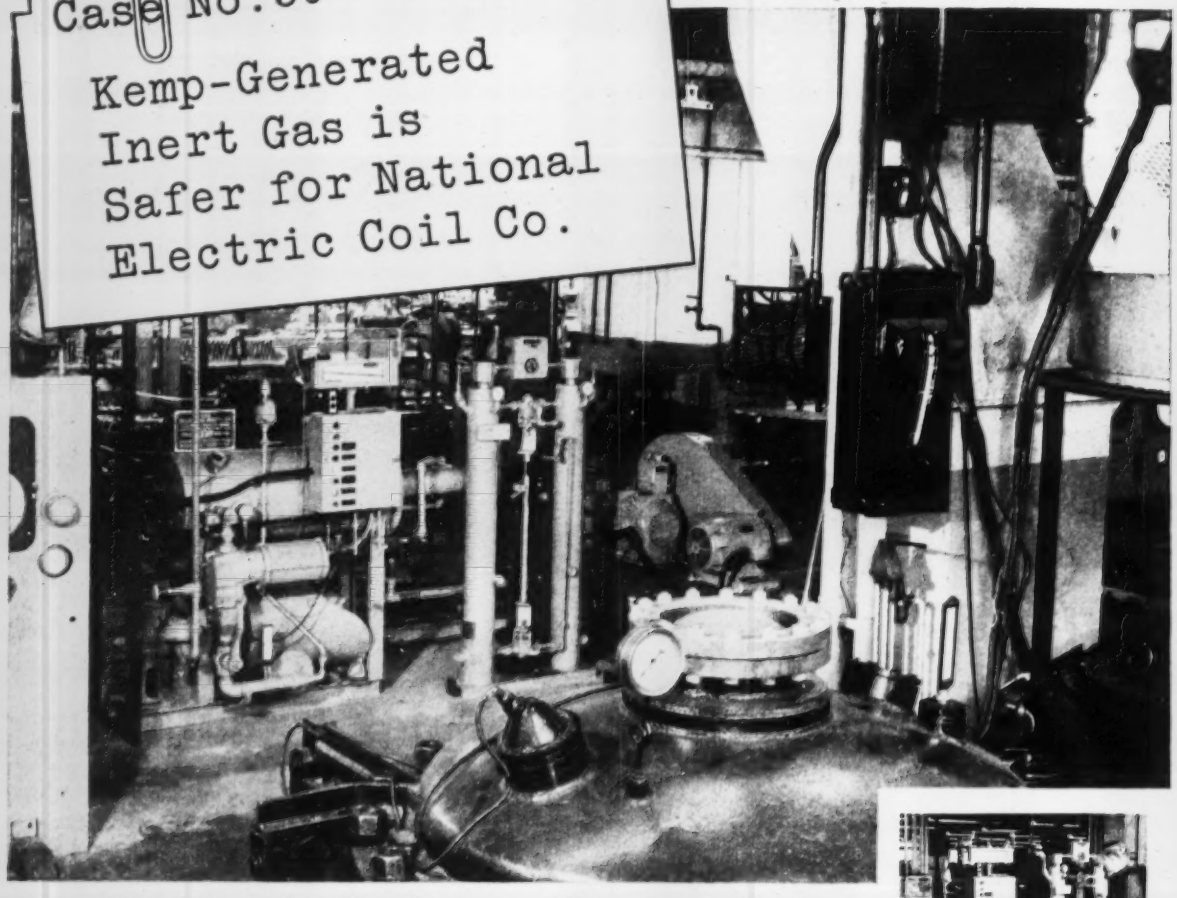
E. W. Bliss Company (Paris), St. Ouen sur Seine, France

Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo, and Toronto, Canada. **West Coast Representatives:** Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Co., Seattle. **Other dealers** in United States cities and throughout the world.

Remember: **for Presses, ROLLING MILLS, Special Machinery...** **It's Bliss**

Case No. 59

Kemp-Generated Inert Gas is Safer for National Electric Coil Co.



How National eliminates danger of explosion . . . cheaply and conveniently

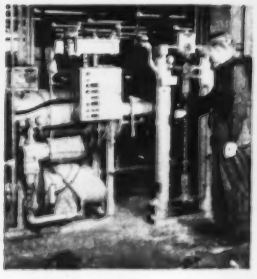
National Electric Coil Co., Columbus, Ohio, impregnates electric coils and windings by forcing in a hot sealing compound with inert gas under pressure. Formerly, the Company used air under pressure, but this created an explosion hazard. National then switched to CO_2 generated by melting dry ice. Although this decreased the danger factor, it was an extremely expensive operation and very inconvenient. To modernize this process and cut costs, National installed a Kemp Gas Generator, Model MIHE.

Kemp Solved the Problem—and More

Now National's Kemp installation delivers a completely satisfactory inert—eliminating any danger of explosion. And it delivers it at a *much lower cost* than the former generating method. In addition, Kemp supplies the gas at the rate required, plus a reserve for storage. As for convenience, the company considers their unit entirely automatic—it is practically never touched. According to Mr. D. E. Stafford, Chief Engineer, "It just sits there and operates."

Kemp Can Solve Your Problem Too

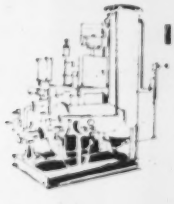
Every Kemp Generator is engineered for fast-starting, easy operation that saves both *time* and *money*. Kemp equipment delivers a chemically clean inert at a specific analysis . . . without fluctuations regardless of demand. And every Kemp design includes the latest firechecks and safety devices. For convenience, safety, and cleaner, more dependable gas—specify Kemp.



Mr. Wm. C. Graessle, of the engineering department, checking the operation. Generator features the Kemp Carburetor, part of all Kemp equipment, to deliver complete combustion . . . without waste, without tinkering.

For more complete facts and technical information, write for Bulletin I-10 to: C. M. KEMP MFG. CO., 405 East Oliver Street, Baltimore 2, Md.

KEMP OF BALTIMORE



INERT GAS GENERATORS

CARBURETORS • BURNERS • FIRE CHECKS
METAL MELTING UNITS • ADSORPTIVE
DRYERS • SINGEING EQUIPMENT

X marks the spot

FOR THE STEEL STRUCTURE YOU NEED...

Naturally, shipways dominate the waterfront at the great Sun Ship plant. But, Sun Ship builds for land and sea, and a brief distance from the riverfront is a gigantic complete plant of shops and facilities for building steel plate structures, machinery and special equipment for varied types of industry.

At the spot marked "X," for instance, is the Sun Ship plant where the massive turbine casing shown above was assembled. Then it was shipped in sections to a distant site for a hydroelectric power plant. Building this complicated structure —more than 22 feet in diameter at the intake and with a 60-foot outside diameter— offered no great problem to Sun Ship's master engineers and skilled craftsmen.

In this versatile plant, "X" could mark many shops with facilities for building machinery, pressure vessels and almost any other type of special equipment American industry needs. The operation of this large plant on the Delaware has long been a mighty factor in building a greater America.

Sun

SHIPBUILDING & DRY DOCK COMPANY

SINCE 1916

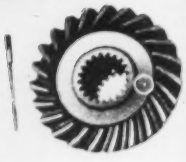
ON THE DELAWARE • CHESTER, PA.

25 BROADWAY • NEW YORK CITY

METAL DISINTEGRATION

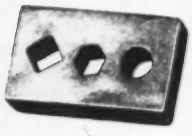
and what it can do for you . . .

Remove Broken Taps fast without distortion



Cut oil holes in hardened gears without annealing

Cut dovetails in hardened dies



Cut any shape hole in cemented carbides

Literally hundreds of thousands of dollars are saved annually by corporations that are using Metalmasters in just tool and die repair alone.

There's a technical engineer in your area to give you an on-the-spot demonstration in your own plant at your convenience. (NOTE: It is not uncommon to pay for a Metalmaster with just one short demonstration thru savings on workpieces.)

For information as to the Metalmasters' uses and benefits merely write today on your company letterhead to:

Metalmaster

DIVISION OF CLINTON MACHINE COMPANY

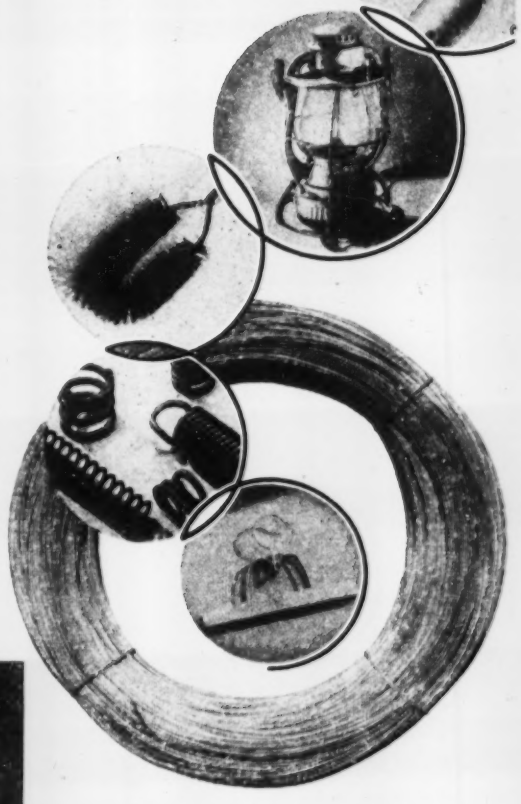
CLINTON, MICHIGAN

What do YOU make that takes wire?

IF you make sieves or staples, screws or screens—whatever you make that takes wire—we're pretty sure to have the kind of manufacturers wire you need. Round, flat, square . . . hard, soft, ductile . . . plain, tinned, or bright finished . . . carbon, alloy, or stainless. Altogether we produce over 400 different types of wire which are suitable for practically all everyday wire applications.

But, if you need a special kind of wire, we can supply that too. Our modern plant facilities enable us to draw wire to meet the exact specifications of a special order, and our trained metallurgists are always ready to assist you with any manufacturing problems you may have.

We've been in the wire-making business more than one hundred years, and all of our experience is at *your* service . . . to help you do an easier and better fabrication job.



If you make it of wire... make it of the best!

U·S·S AMERICAN MANUFACTURERS WIRE

AMERICAN MANUFACTURERS WIRE

AMERFINE—*High-quality fine wire.*

AMERSPRING—*music steel spring wire.*

AMERLOY—*alloy heading wire.*

AMERTEMP—*heavy-duty oil-tempered wire.*

AMERHEAD—*uniform heading wire.*

AMERSTITCH—*extra-tough metal stitching wire.*

USS

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO

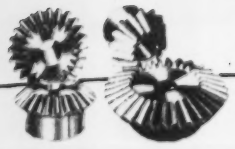
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS

TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

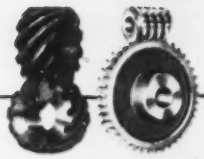
UNITED STATES STEEL

Design Around

SPUR GEARS — PINIONS
CHANGE GEARS

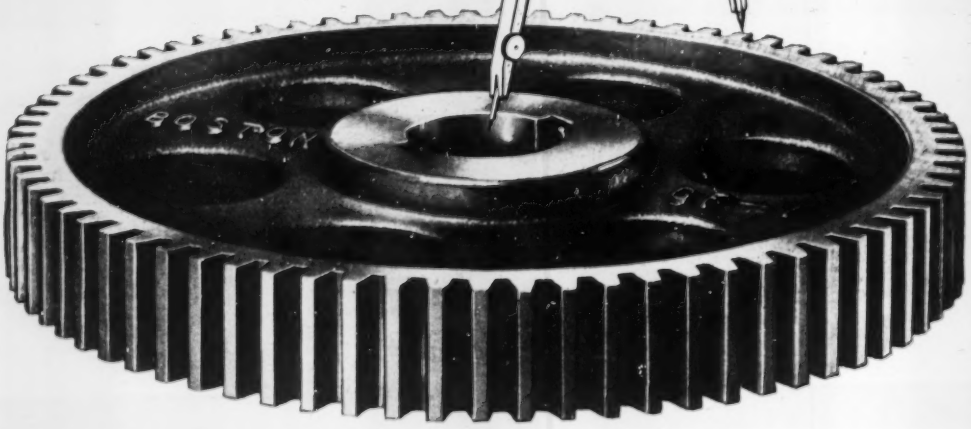


MITRES — BEVEL GEARS



HELICALS
WORMS and WORM GEARS

CHAIN and
SPROCKET

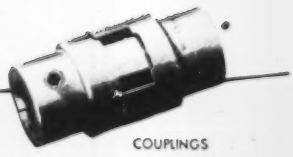


BOSTON GEAR CATALOG

Lists all gears and other BOSTON Products. Contains time-saving information on gear selection and useful reference data. Ask your Boston Gear Distributor . . . or write: Boston Gear Works, 73 Hayward Street, Quincy 71, Mass.

PILLOW BLOCKS
and
FLANGED CARTRIDGES

UNIVERSAL JOINTS



COUPLINGS

Put this **STAMP OF APPROVAL** of 250,000 users on your product.

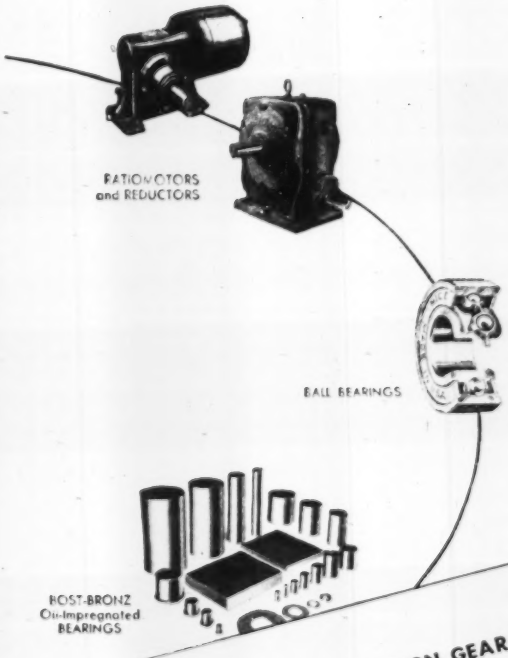
EQUIPPED WITH BOSTON gear® Standardized Products

BOSTON gear®

STANDARD STOCK GEARS

and other

POWER TRANSMISSION EQUIPMENT



for LOWER COST

Compare your gear-cutting costs with cost of precision-made, completely interchangeable BOSTON Standard Stock Gears. You'll find it pays to design around BOSTON.

for WIDEST SELECTION

The BOSTON Catalog lists over 2000 types and sizes of gears . . . and a full range in the many other BOSTON Power Transmission Products.

for PROVED QUALITY

There's no "gamble" when you add BOSTON to your purchasing specifications. BOSTON quality has remained the industry's standard for 75 years. That's why BOSTON products are first choice of more than 250,000 cost-wise industrial buyers.

for NEARBY STOCKS

These BOSTON Products are available from 80 of the nation's top-rated, most experienced Industrial Distributors. When it's BOSTON equipped, the machine you make is only minutes away from a reliable source of repair parts.

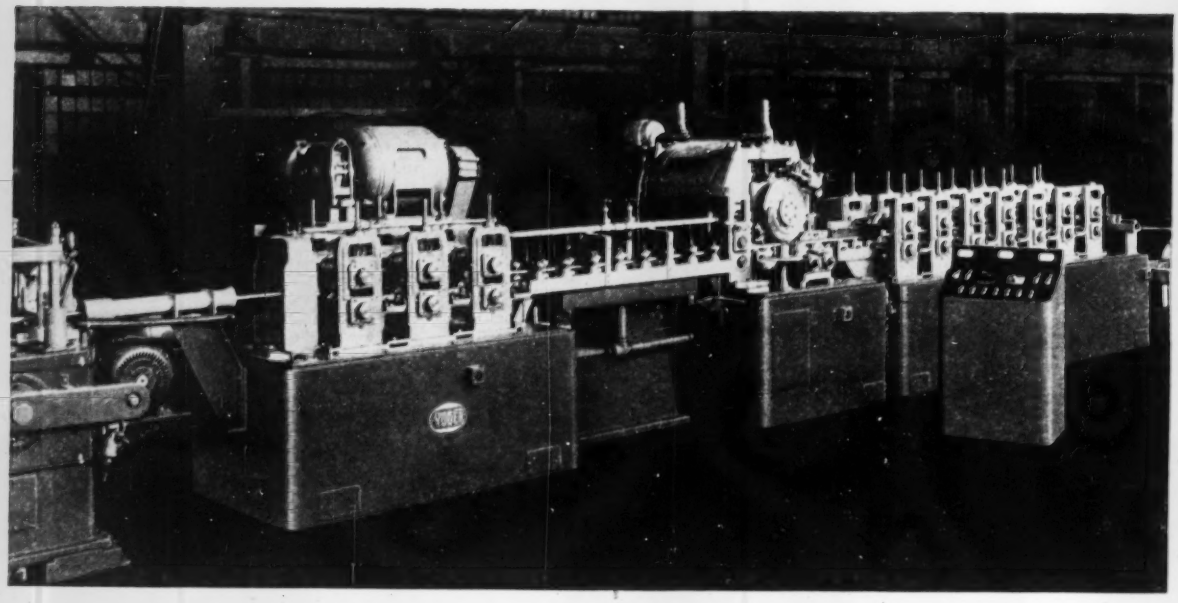
At Authorized BOSTON GEAR DISTRIBUTORS — a

$10,000,000

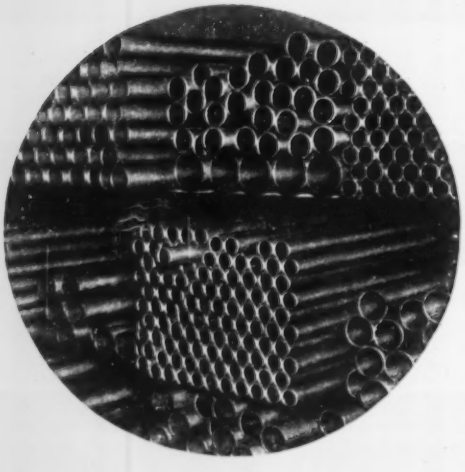
stock of BOSTON Gears and other BOSTON Products is ready to fill your orders promptly

GET THE "BEST BUY" . . . GET IT FASTER

Let **BOSTON** *be your "buy-word"*



Highest Output of



Quality Tubes

● Most manufacturers, when investing in an electric-weld tube mill, do so only after careful investigation, especially of performance records. Where, as often happens, records are available of the output and scrap losses of different mills, making comparisons possible, the choice of a Yoder is never in doubt. As a result, since their introduction in 1938, more Yoder mills have been installed in the U.S.A. and many foreign countries than electric-weld mills of all other makes combined.

In fact, the high quality and economy of tubing made in Yoder mills, have powerfully stimulated consumption and multiplied the uses for electric-weld tubing in the automotive, electric appliance, metal furniture and other mass production industries. The supply of such tubing, therefore, has never caught up with the demand.

Get the facts about Yoder mills, incorporating the latest developments in tube making, including the revolutionary new Yoder high speed induction welders for *non-ferrous as well as ferrous metals* and alloys.

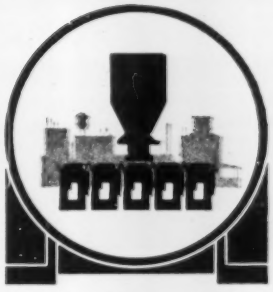
THE YODER COMPANY
5502 Walworth Ave. • Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS–cold forming and welding

ENGINEERING YODER MANUFACTURING

Metal Working



Food Processing

Grain Handling

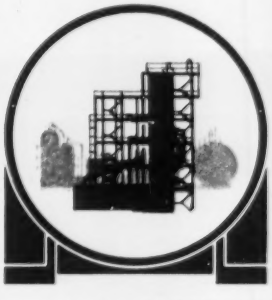
Electric Motors

for every industry

When you need electric motors . . . in any rating, or frame type . . . one or a thousand . . . *always* look for the Fairbanks-Morse Seal. For over 120 years it has stood for the finest in manufacturing integrity to *all* industry.

Fairbanks, Morse & Co., Chicago 5, Illinois.

Chemical Processing



Petroleum Refining

Fairbanks-Morse totally-enclosed, fan cooled motor—in a complete horsepower range.

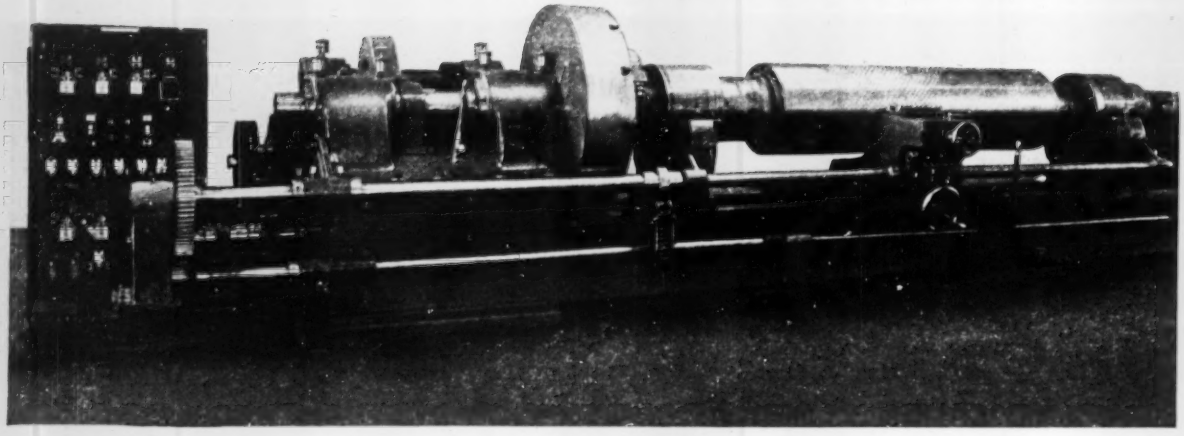
FAIRBANKS-MORSE

a name worth remembering when you want the best

ELECTRIC MOTORS AND GENERATORS • DIESEL LOCOMOTIVES AND ENGINES • RAIL CARS • PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

Engineered Rebuilding

How Simmons Methods Increase Machine Tool Output and Efficiency



REBUILT...REDESIGNED... ITS PRODUCTION TRIPLED

It used to take a manufacturer of steel floor plate 350 hours to groove the alloy rolls which made his plate. "Too slow," they said, and asked Simmons if they could convert a standard lathe to their special purpose. Here's how Simmons' engineers did it:

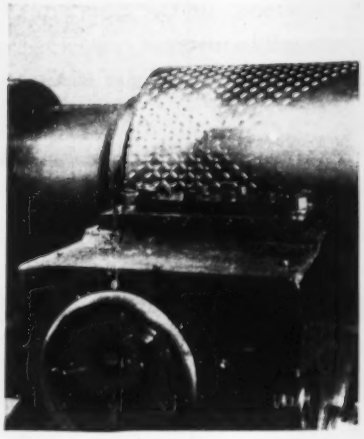
- **Rotation of the roll, traverse of carriage, and movement of carriage head were all synchronized, and all gears and clutches kept free of lost motion.**
- **Special gearing devised and built which maintains same groove spacing on rolls of varying diameter.**

In addition, the lathe was completely rebuilt—all sliding surfaces replaced... new bearings installed throughout... new motors and wiring.

The result? Average machining time was cut from 350 to 120 hours. Two thirds!

Rebuilding can get results like this for you, too. We'll rebuild and modernize your tools, or buy used ones and rebuild to your needs. Guaranteed performance—delivery within weeks.

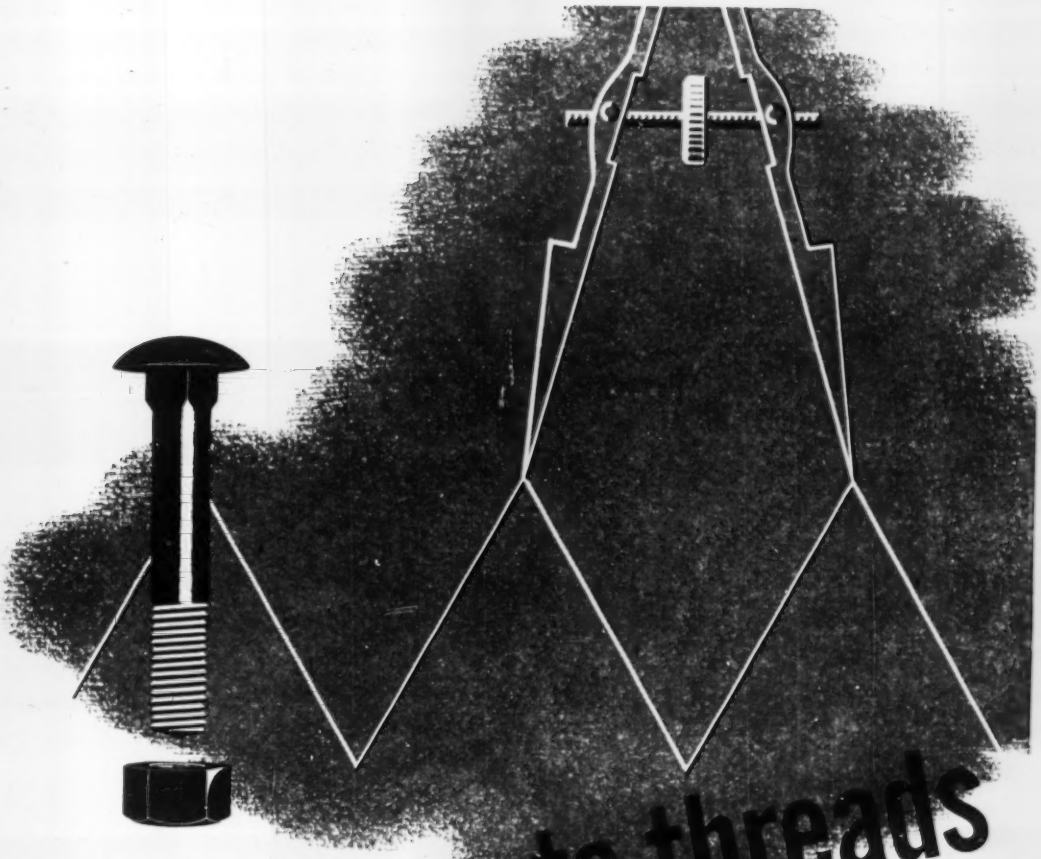
Send us a list of your machine tools that might be rebuilt. We'll promptly quote price and delivery. Write, wire or phone today.



***Close-up of tool carriage** shows how rolls are grooved. The rolls are used in manufacture of steel safety floor plates.*

Simmons Machine Tool Corporation
Main Office and Plant
1755 North Broadway, Albany 1, N. Y.
Export Office
50 East 42nd St., New York, N. Y.
Philadelphia: Phone Victor 8-5133
Pittsburgh: Phone Penhurst 1-3700

SIMMONS GIVES USED MACHINE TOOLS A NEW LEASE ON LIFE



sharp... accurate threads

REPUBLIC UPSON BOLTS AND NUTS

Easy to assemble... easy to take apart—and maximum thread area in perfect contact to assure uniform, lasting grip.

More than 20,000 types, sizes and shapes of Republic Upson Bolts and Nuts have been designed and *engineered* to give peak performance *during* and *after* assembly.

Millions of these top-quality fasteners, in countless applications throughout the world, testify to their many advantages.

REPUBLIC STEEL CORPORATION
Bolt and Nut Division
CLEVELAND 13, OHIO • GADSDEN, ALABAMA
Export Department: Chrysler Bldg., New York 17, N.Y.

REPUBLIC STEEL

Entirely New!

Designed especially to meet present day needs . . . for unprecedented man-hours savings . . . *strong enough* to use carbide tools with high precision . . . *fast enough* to supplant obsolete chucking methods up to 5 to 1 . . . *versatile enough* to demonstrate "UNIVERSAL" chucking application.

NAMCO

REG. U. S. PAT. OFF.

Remember—

You can't do TODAY'S job . . . with YESTERDAY'S tools . . . and be in business TOMORROW

Announcing the

"MC-UNIVERSAL"

the Entirely New 12-inch ACME-GRIDLEY

SINGLE-SPINDLE AUTOMATIC CHUCKING MACHINE

1 **WORK CYCLE AUTOMATICALLY CONTROLLED**—no time loss between loading and unloading work piece.

2 **SIX PREDETERMINED SELECTIVE SPINDLE SPEEDS**, with each combination of change gears, insure correct surface speed for each operation. Wide range of spindle speeds—25 to 1478 RPM.

Two Automatically Selective Feed Ranges with each combination of change gears—for coarse or fine feeds to suit the particular tooling cut.

Five End Working Slides—each independently cammed, and two heavy cross slides—the time-proved Acme-Gridley design. No slides hanging in the air.

Turret Indexing Independent of cross slide operation—located in rugged outer turret support and driven by independent motor.

Open Type Tooling Zone—easy tool adjustments and quick changeover. Minimum cam changes, large chip area, optional chip conveyor.

Accurate—doubly reinforced frame foundation, precision-cut flame hardened steel cams—sustain close tolerances at fastest feeds and highest speeds modern carbide cutting tools can take.

Easy to Operate—compact, free from gadgets—one man runs 2 machines or more, depending on cycle time of job.

THE NATIONAL ACME CO.
170 EAST 131ST ST., CLEVELAND 8, OHIO

(Clip this coupon to your letterhead)

Send me your Bulletin on the NEW Model "MC-UNIVERSAL" Single-Spindle Chucking Automatic as soon as it is off the press.

NAME ..... TITLE .....

COMPANY .....

STREET ADDRESS .....

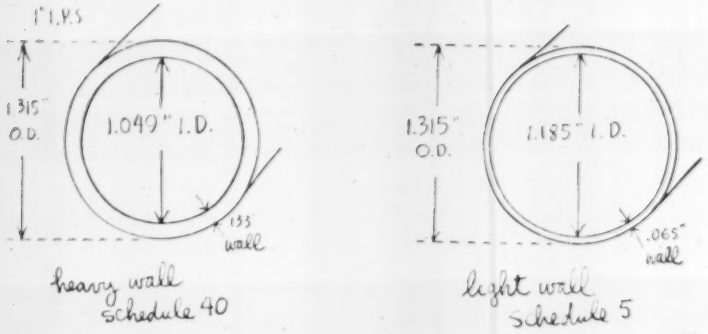
CITY ..... ZONE ..... STATE .....

The NATIONAL ACME COMPANY

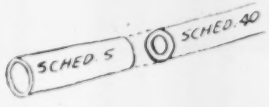
170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics, 1-4-6 and 8 Spindle—Hydraulic Thread Rolling Machines—Automatic Threading Dies and Taps—Limit, Motor Starter and Control Station Switches—Solenoids—Contract Manufacturing.

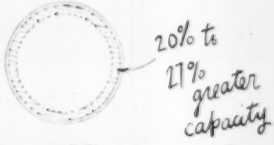
here's what you gain with stainless schedule 5 pipe



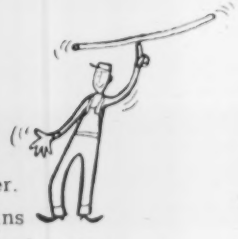
You save money. Schedule 5 pipe costs about half as much per foot as Schedule 40.



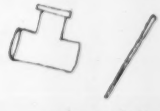
Schedule 5 has the same O.D. as Schedules 10, 40 and 80 —for hook-up with existing lines as well as for new installations.



Its larger I.D. increases flow and capacity in pipelines, exchangers and other equipment.



It's lighter. This means quicker and easier installation.



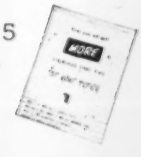
You can save substantially on valves, fittings, weld rods, etc., because smaller O.D. material can frequently be used. Tubing sizes can now be replaced with light wall pipe . . . for ready hook-up with standard valves, pumps, and other equipment normally manufactured in pipe sizes.

Fittings as well as stocks of Schedule 5 pipe are carried by conveniently located Carpenter distributors.

Specify Schedule 5 pipe . . . it saves dollars . . . and makes a lot of sense!

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Dept. The Carpenter Steel Co., Port Washington, N.Y. "CARSTEELCO"

Data Sheets give you complete information about Carpenter Schedule 5 Stainless Pipe. Write for your personal copy.



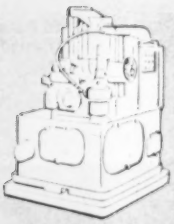
THE U.S. NEEDS YOUR STEEL SCRAP NOW

Carpenter

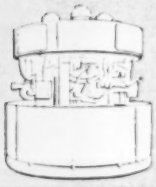
STAINLESS TUBING & PIPE

Analysis · Tolerance · Finish

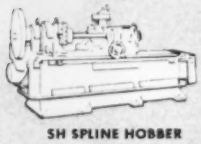
- guaranteed on every shipment



12-S HOBBER

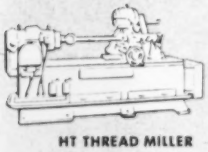


7-A ROTARY HOBBERS

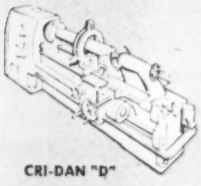


5H SPLINE HOBBER

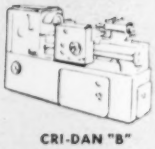
MODEL 40 THREAD MILLER



HT THREAD MILLER



CRI-DAN "D"

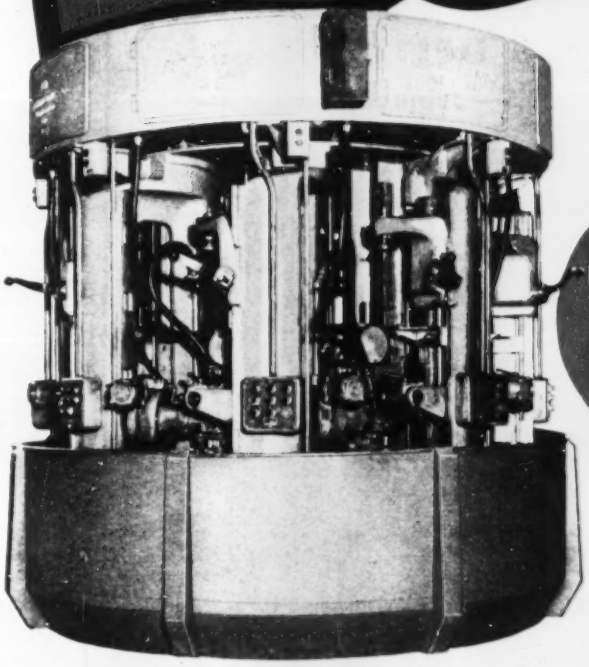


CRI-DAN "B"

HIGH PRODUCTION

TOUCH-BUTTON HOBBING

With Modern Lees-Bradner 7-A Rotary Hobbers



THE LEES-BRADNER MODEL 7-A 8-SPINDLE ROTARY HOBBER

Look to Lees-Bradner, pioneers in high-production machine tools, for the ultimate in precision hobbing.

The now famous line of Model 7-A hobbers have established remarkable records in leading production plants throughout the country.

No matter what your hobbing job, or the volume of production required, there's a machine to fill your needs in the 7-A line of eight, six and four spindle rotary hobbers or the single-spindle machine.

For detailed engineering and production data call in your Lees-Bradner representative or write the company direct.

QUICK FACTS ON THE MODEL 7-A HOBBERS

- Push-Button Production Controls
- Electric Hob Shifter
- Electronic Counter for Longer Hob Life
- Patented Automatic Hob In-Out Mechanism

the LEES-BRADNER Company

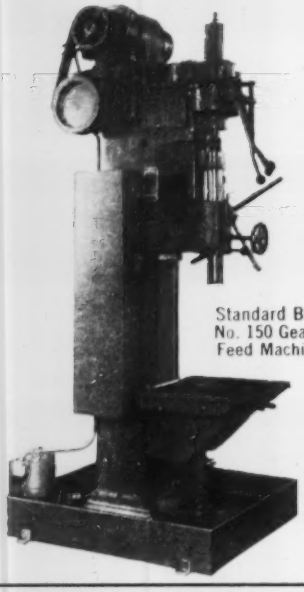
CLEVELAND 11, OHIO, U.S.A.

BAKER

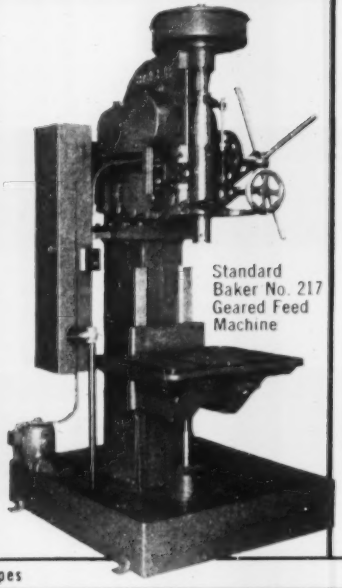
Standard HEAVY-DUTY DRILLS

2 to 4 WEEKS DELIVERY . . .

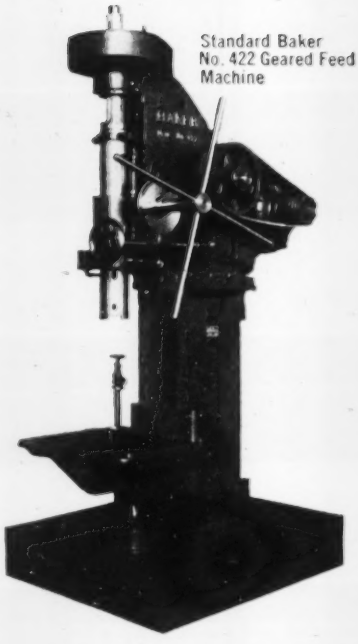
ON THESE MACHINES—Subject to prior sale



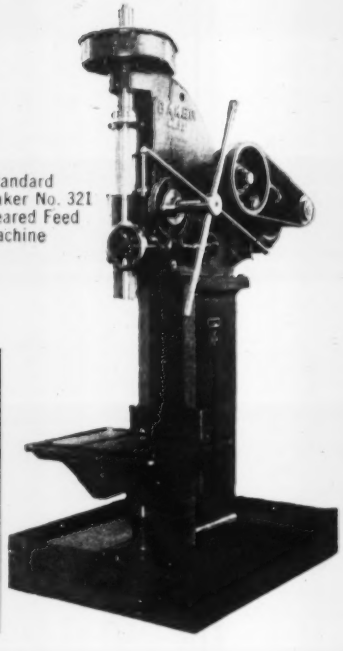
Standard Baker No. 150 Geared Feed Machine



Standard Baker No. 217 Geared Feed Machine



Standard Baker No. 422 Geared Feed Machine



Standard Baker No. 321 Geared Feed Machine

MAJOR SPECIFICATIONS—Single Purpose Types

	150	150 Q C†	217	321	422
1. Capacity—Max. Dia. Drill in S.A.E. 1035 Steel	1½	1½"	2	3	4½
2. Max. H. P. Motor used	7½	7½"	10	15	20
3. Distance center of Spindle to Frame [Gap]*	11"	11"	12¼"	12¼"	12¼"
4. Maximum Spindle Travel	11"	11"	12"	16"	16"
5. Spindle—Outside Dia. splined driving end	1¾"	1¼"	2"	2-13/16"	3¼"
6. Dia. of Spindle Sleeve	2¼"	2.750"	3¼"	4¼"	5¼"
7. Dia. of Spindle Nose	2.975	2.975"	.3225	4.225"	5.225
8. Morse Taper in Spindle as standard	No. 4	No. 4	No. 5	No. 5	No. 6
9. Standard Speed Range in R.P.M.	151-632	48-1120	76-614	27-220	20-165

* Can be increased 3" by use of offset Spacer Block. † Quick Change, 12 Speeds

Baker single purpose type drills are heavy duty . . . provide a wide range of speeds and feeds for Single and Multiple Spindle Drilling . . . Reaming . . . Boring . . . Facing . . . Chamfering . . . Undercutting and Tapping Operations. Write for full details.

Baker Brothers, Inc.
Toledo, Ohio

Gentlemen:

Please send more information on Baker Standard Drills to:

NAME.....

COMPANY.....

STREET.....

CITY.....STATE.....

BAKER BROTHERS, INC. Toledo, Ohio

DRILLING...TAPPING...KEYSEATING and CONTOUR GRINDING MACHINES

Industry's Favorite

DIE STEELS

for

COLD WORK

SELECTED FOR

- Machinability
- Hardenability
- Dimensional Stability
- Wearability

COLONIAL NO. 6

NON-SHRINKABLE

Oil hardening. Combines machining ease with low hardening temperature and excellent stability. Very widely used.

OHIO DIE

Air hardening. High carbon, high chromium alloy with exceptional resistance to wear, providing long die life.

AIR HARD

Air or oil hardening. A fine steel for intricate dies where movement cannot be tolerated.

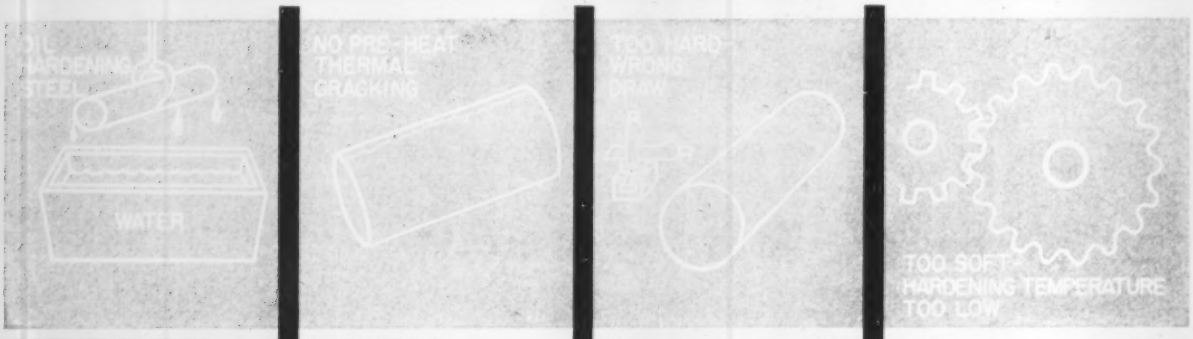
These leading First Quality Die Steels cover the field of your most exacting cold work requirements. Specify them *by brand*, and get the distinctive performance built into each by complete control of manufacture—from our exclusive melting formulas to the last laboratory and production checks of the finished steels. • Do you have our 24-page Cold Work Die Steel Catalog?

Vanadium-Alloys
STEEL COMPANY
LATROBE, PA.

COLONIAL STEEL DIVISION • ANCHOR DRAWN STEEL CO.

A SURE WAY TO PREVENT ERRORS

in HEAT TREATMENT



PREVENT THIS... AND THIS... THIS... AND THIS... *PLUS*

One of the most common causes of error in heat treatment is failure to give the heat treater necessary data on the physical properties and chemical composition of the material to be treated.

When parts do not respond to treatment as expected, further corrective treatment is often necessary thus wasting valuable time and hard earned money for both the customer and the heat treater. Or in extreme cases the part is actually rendered useless and becomes scrap.

Acceptance and use of the new SAE designations given to commonly used steels to show their *heat treating characteristics and reactivity* will do a great deal to eliminate costly error and uncertainty.

Use of these identifying codes will save further time for the customer and the heat treater since the standardization of the SAE designations will make many other specifications presently used unnecessary.

Copies of the SAE number assigned to various materials in accordance with their heat treatability can be obtained from your local MTI member or from the Metal Treating Institute.

Get a copy now and you will easily see how their use will *help you*.

Consult these Companies*

There's a Heat Treating Specialist Near Your Plant!

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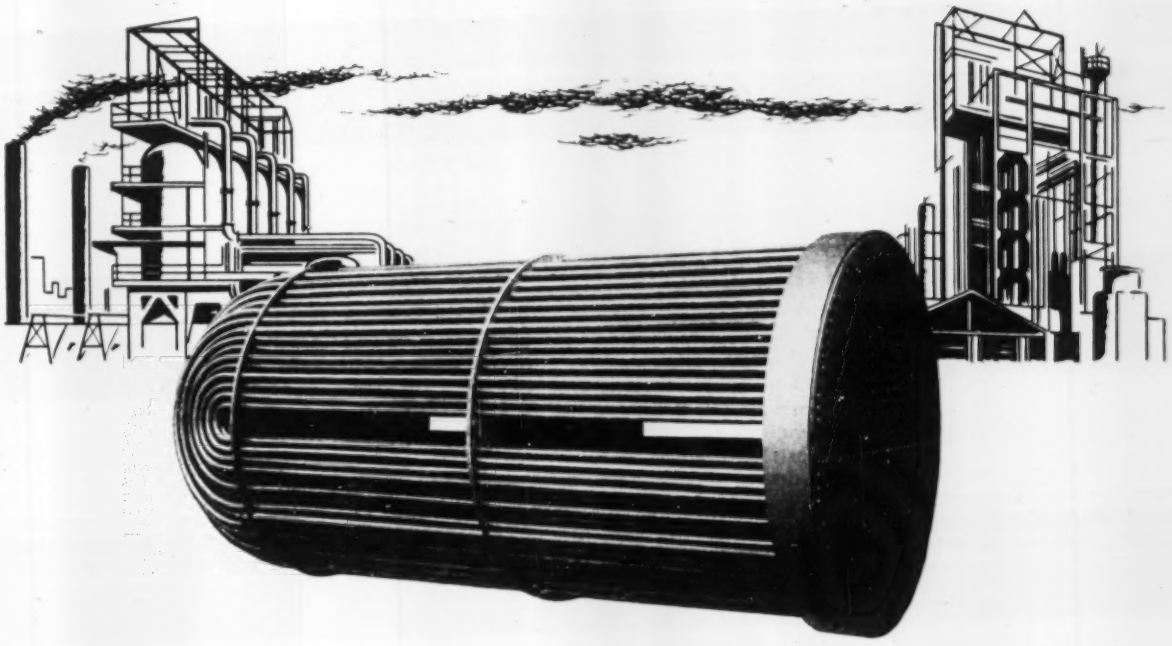

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Round: ¾" O.D. to 2¾" O.D.
Square: ¼" to 2" O.D.

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WELDED CARBON TUBING
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COLD FINISHED
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If you are cracking crude or reforming fractions . . . or using any process where condensers and heat exchangers are components . . . you need tubing of extra good quality—and in the West the best is Pacific.

Pacific has the mill . . . the engineering and metallurgical know-how . . . the modern equipment to produce cold-drawn seamless tubing; welded and drawn stainless steel tubing; welded carbon tubing in both the quality and quantity you need. Our position in the heart of the Western Industrial Area is an additional assurance—that we deliver on-time, every time.

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Superior Tube Company, manufacturers of fine small tubing in all analyses from .010" to ⅝" O.D. and in certain analyses (.025" max. wall) up to 1⅜" O.D.

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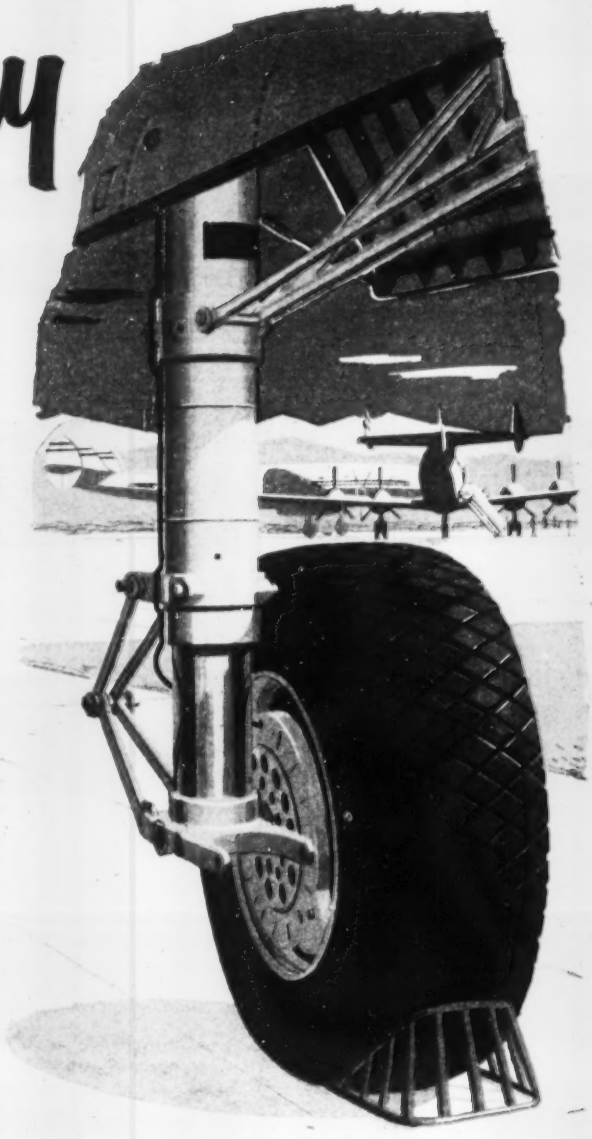
Aluminum is Why

Single press stroke saves $10.00 worth of machining

Hogging this landing gear plunger out of bar stock wasted half the aluminum in chips—tied up valuable machine capacity—squandered costly man-hours.

Because even tough aluminum aircraft alloys are ductile and formable, Alcoa engineers and aircraft designers saw the savings possible by impact extruding this part. Today, a slug of tough aluminum alloy is placed in a shallow die—a punch strikes it—the aluminum squirts upward, faster than the eye can follow. Almost instantaneously a plunger is ready for finish machining and assembly—a saving of $10.00 per part.

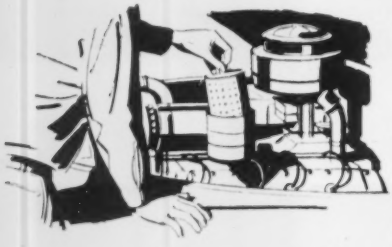


ALCOA is How

Though impact extruding is not new, it has been confined to simple, cup-shaped parts of workable alloys. But here, a *tough* alloy has been extruded. Nor is the shape simple. It is *thick bottomed, heavy walled* and the open end is flared, all an integral part of the extruding process. Impact extrusions, as Alcoa makes them, compete with almost every fabricating process. Let your local Alcoa Sales Engineer help you explore their possibilities. Aluminum Company of America, 877-D Alcoa Bldg., Pittsburgh 19, Pa.

Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

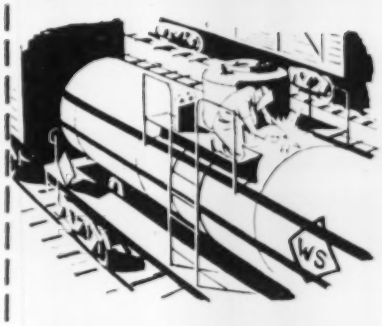


This strong, one-piece oil filter housing is an aluminum impact extrusion, produced by Alcoa in a single press operation. Formerly, this part required several operations.

Fabricating this double-wall fuse cap formerly involved an expensive welding operation. Now it is impact extruded by a single press stroke at Alcoa's Edgewater plant.

Used in electronic work, this impact-extruded can demonstrates an extreme length-to-diameter ratio which goes far beyond limits formerly believed possible.

Alcoa Aluminum takes all finishes that other metals will take—plus gleaming, rust-resistant anodic coatings which are best on aluminum.



While large structures are usually arc-welded, aluminum assemblies also can be joined by torch welding, all three resistance-welding processes—spot, seam or flash, and brazing.

Products marked* are available from your local Alcoa Distributor listed here

* Lightweight, easy-to-handle Alcoa Industrial Building Sheet (only 56 pounds per square) goes up fast . . . reduces dead load . . . stays good looking without painting or finishing.

Corrosion-resistant bearings of Alcoa Aluminum lower diesel maintenance. They are solid metal all through.

Alcoa Aluminum Die Castings can weigh one-third as much as heavy metal castings, yet provide great strength. They are exceptionally easy to machine . . . take all finishes . . . often cost less.

* Almost any shape can be produced as an Alcoa Aluminum Extrusion —hollow, semihollow, solid. Extrusions put the metal where it's most needed, yet use less metal than rolling or fabricating by welding or riveting.

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ON A SINGLE SLITTING LINE!

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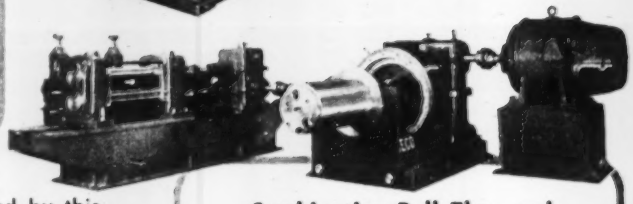
PRECISION SLITTING LINE
Handles ALL Gauges from .010" to .125"
With Exceptional Accuracy and Speed



Combination Pull-Thru and Power-Driven Line Gives Unusually Wide Range

Two or three narrow-range slitters can be replaced by this one SECO Precision Slitting Line. This extremely versatile line slits all gauges from .010" to .125"—cold-rolled steel, brass or aluminum. It is highly accurate—and handles all thicknesses on a fast, profitable production basis.

This particular SECO Line is designed for 24" wide strip in coils weighing up to 6,000 pounds. It makes 24 cuts in gauges up to .035" at line speeds from 400 to 1200 FPM—and handles strip up to .125" at speeds from 150 to 400 FPM, making up to 14 cuts.

SECO Slitting Lines, modern in design and rugged in construction, can be built with many efficient features. For more information on SECO Slitting Lines, or the answer to your specific slitting problem, write today. Our engineers will be glad to furnish full information and data—with no obligation to you.

Both the slitter and recoiler on this SECO Precision Line are driven from one 40 HP AC/DC adjustable speed motor. The slitter can be used as either a "pull-thru" type—for finer gauges up to .035" or "power-driven" for heavier gauges up to .125". The slitter has eccentric rotary box type arbor mountings—to accommodate any knife diameter—with Timken tapered roller bearings. The design can easily be adapted for your particular requirements.

STEEL EQUIPMENT CO. P.O. Box 737, Warrensville Station, Cleveland 22, Ohio

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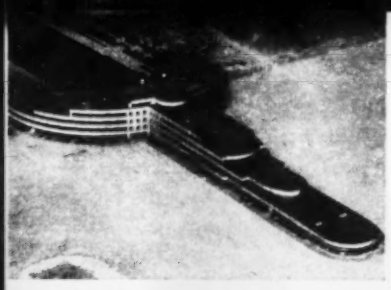
DESIGNERS and BUILDERS of the following STEEL MILL EQUIPMENT

Leveling and Shearing Lines . . . Combination Edging and Flattening Lines . . . Tension Reels for Strip Polishers . . . Narrow Strip Grinding Machines . . . Multiple Strand Pull-Out Rolls and Take-Up Frames . . . Strip Coilers of the Up and Down Coiling Types . . . Traverse Reels for Narrow Strip . . . Scrap Ballers.



Huge Terminal Building at World's 2nd Largest Airport

By AMERICAN BRIDGE

Interesting Facts

Airfield is 2nd Largest in World.

Terminal Building is Largest in World.

The terminal building provides facilities of a small city, including a 62-room hotel, a restaurant to accommodate 3000, numerous shops.

Designed by: Allegheny County Department of Aviation.

Owner and Operator: Allegheny County Department of Aviation.

Architect: Joseph Hoover, Pittsburgh.

Consulting Engineer: L. W. Cook, Pittsburgh.

Structural Steel Fabricated and Erected by American Bridge: 4,000 Tons.

AVAILABLE NOW! *For showing in churches, schools, clubs and industries, the new sound and color motion picture— BUILDING FOR THE NATIONS — a candid, factual photographic record of the highlights of the fabrication and erection of the United Nations' Secretariat Building.*

4,000-Ton steel framework fabricated and erected for 460-ft. semi-circular 7-story Administration Bldg. and 578-ft. Loading Dock

THE new thirty-three million dollar Greater Pittsburgh Airport, opened in June 1952, is an impressive sight. Its sixteen-hundred acre airfield is the second largest in the world . . . larger even than Washington's National Airport and New York's LaGuardia Field combined!

But, as impressive as is the airfield itself, it is overshadowed by the spectacular Administration Building. This seven-story, semi-circular structure with its long loading dock is easily the world's largest terminal building.

American Bridge fabricated and erected the 4,000-ton steel framework for this huge structure which is 460' feet in breadth at its widest point, and with its 578-ft. loading dock has an over-all length of 979 feet. Nine months after the erection crew took over, the last rivet was driven.

This huge building is another example of American Bridge engineering and fabricating "know-how". And it is your assurance that you can depend on American Bridge to handle any type of steel-frame construction with thoroughness and speed . . . any time . . . anywhere. If you would like to know more about the advantages of American Bridge fabricated and erected construction, call our nearest office.

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LETS EXPANSION KEEP ON THE MOVE

PENFLEX TUBING

ABSORBS THERMAL EXPANSION...PROVIDES FLEXIBILITY

Write for this helpful folder, "Flexineering."

Coal dust showers over equipment, floors and lines were regular occurrences in one large power plant. Thermal expansion moved steel tubes feeding powdered coal to the burners of high pressure steam boilers.

Then Penflex "Flexineering" recommended a flexible steel "overcoat" for the rigid steel feed pipe. Lengths of 20" and 24" I.D. interlocking, galvanized steel tubing were installed. Penflex tubing now forms a flexible seal between the hopper and tube, assuring protected delivery of powdered fuel.

Let Penflex "Flexineering" help you on tubing problems. Penflex manufactures a complete line of four-wall, interlocking and seamless welded corrugated flexible tubing . . . metallic hose, tubing or couplings from 1/8" I.D. and up . . . automatic barrel fillers, pneumatic rivet passers, accessories and fittings.

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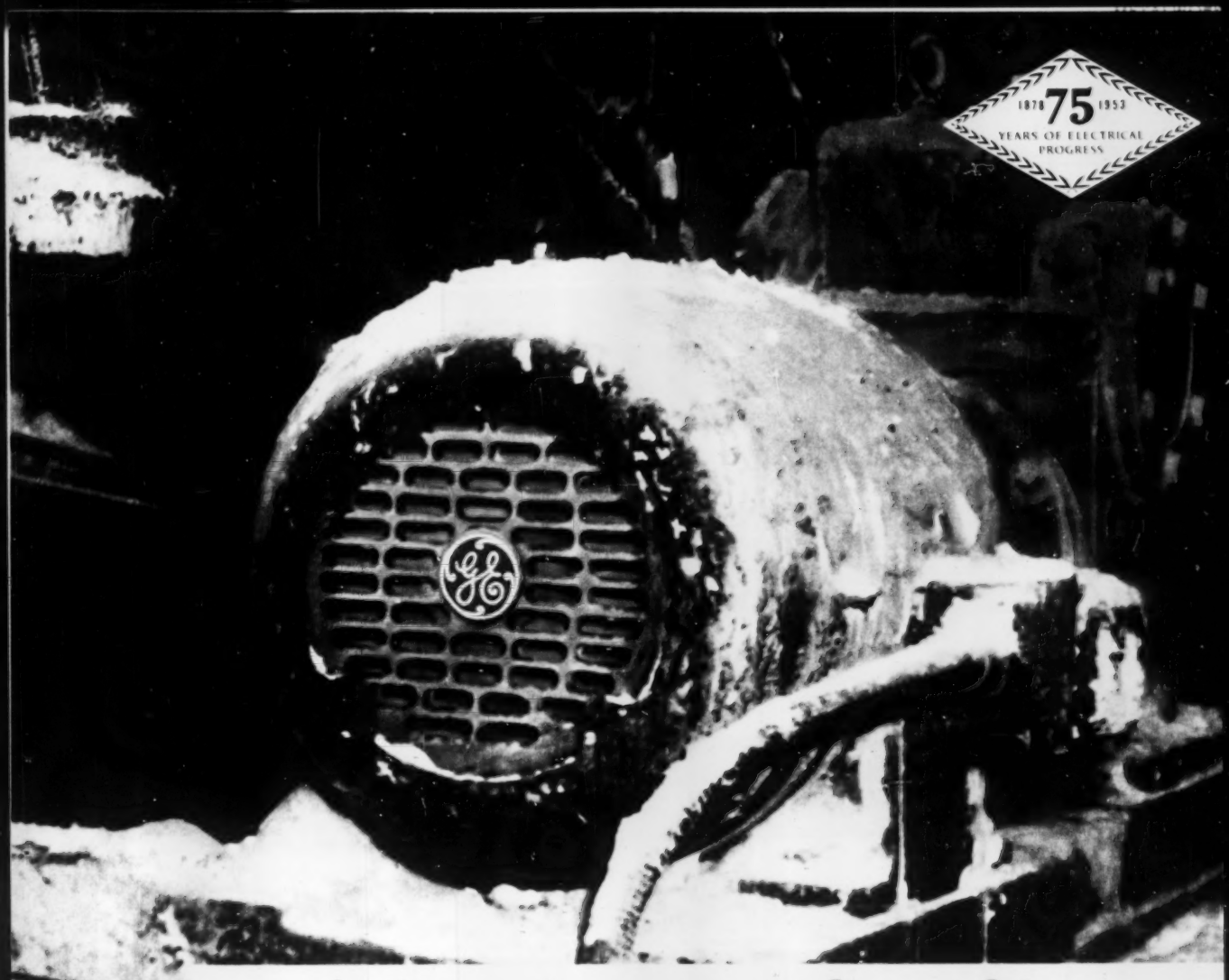
Branch Sales Offices: **Boston • New York • Chicago • Houston • Cleveland • Los Angeles**

PENFLEX

HEART OF INDUSTRY'S LIFE LINES



Corrosion won't hurt this TRI CLAD motor's cast-iron frame

HERE'S A COMMON SIGHT AROUND MANY PLANTS— A G-E Tri-Clad motor operating reliably and continuously under the extremely corrosive conditions that cause many other motors to fail.

THAT'S WHY YOU CAN EXPECT superior performance from G-E Tri-Clad motors. Consider these facts:

CORROSION-RESISTANT CAST-IRON means longer motor life. Unlike steel, cast-iron resists corrosive pitting, even when the paint is chipped.

RIGID, CAST STATOR FRAME with integrally cast feet, can't be twisted out of line by accidental jarring or by excessive "bolt-down" pressure on the feet.

STRONG, CAST-IRON END SHIELDS have cast ribs for extra strength without adding extra weight . . . protect the true motor alignment even under heavy shaft loads.

ORDER G-E TRI-CLAD MOTORS from your nearby G-E Apparatus Sales Office or G-E Agent or distributor. General Electric Co., Schenectady 5, N. Y. 752-19

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INTO THE "BLUE"
Circular Welded Components Have Played A Spectacular Part In The Development of Jet Aircraft Engines. The Special Designs Of Rings, Bands And Other Jet Engine Weldments Have Required New Alloys And Must Meet Exacting Requirements.
Since World War I, welding has been our business and today every U. S. jet engine manufacturer is a user of "American Welding" component parts. If your requirements involve either fusion or resistance welding of ferrous or non-ferrous metals, drop a line to our Product Development Division. We can provide complete designing, engineering, metallurgical and machining facilities and will be glad to put our 34 years of welding experience to work on your problem.
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WARREN, OHIO • 110 DIETZ ROAD

The Metalworking Outlook

April 13, 1953

No Steel Strike in 1953

Odds are against a strike in basic steel this year. Average wages at $2.21 an hour are about 25 cents higher than a year ago, but workers haven't yet recovered their financial breath from the two-month walkout in 1952. The companies, themselves, were also winded by the disturbances, so they'll be anxious to avoid a repetition this year when talks reopen in May. As usual, no specific union demand will develop until negotiations are well along.

On the Way Out—Escalator Contracts

Escalator-type labor contracts based on the cost-of-living index are on the way out. When many of those agreements expire, you can expect them to be dropped quietly. Workers no longer like them, particularly since the last dip in the "old series" index meant a 3-cent cut to 1.3 million railroad men and 1 cent an hour less to more than 1 million auto and farm equipment employees. The new battle cry will be the guaranteed annual wage, which will be tested for sound only this year in preparation for a real contest in 1954 or 1955.

A Nudge Toward Unity

A major factor nudging the CIO and AFL toward unity is concern by both over the relative decline in membership among unions. Union members totaled 14.8 million in 1945, 27.5 per cent of the labor force. They total about 15 million now, only 24.6 per cent of the labor force. Significantly, the first step toward unity was taken last week when the two organizations appointed a committee to study ways to eliminate raiding. They didn't say so, but the real purpose of the group will be to figure a more positive approach to boosting membership. Now is the time because employment is at a peak of 61.5 million, and the labor force is approaching 63 million, compared with 62.6 million a year ago.

Appliances Boom

Appliance sales are booming, as well as automotive. General Electric Co., for example, sold 10 per cent more of its major appliances in the first quarter than in the comparable 1952 period. Refrigerators gained 3 per cent, automatic clothes dryers and washers climbed 40 to 50 per cent. But food waste disposers, water heaters and dishwashers dropped 3 to 10 per cent.

Obsolete Capacity Abandoned

U.S. Steel Corp. is abandoning the No. 3 open-hearth shop at its Homestead works. The obsolete, 56-year-old facility had 24 small furnaces capable of turning out about 1 million tons of ingots a year which went mostly into plates and structurals.

Changes at the Pentagon

A big change in Pentagon procurement policies and techniques is inevitable. The copious testimony before congressional committees

Production Engineering News p. 105 The Market Outlook p. 147

pointing to waste and the strong desire by the White House to cut spending make it certain that a reshuffle is near. President Eisenhower alone will decide on the size of our mobilization base, so until he makes up his mind there's no telling when, where or how much the defense program will be cut back or stretched out.

Permanent Small Business Agency?

Pressure mounts for a permanent and independent small business agency. It may not come in this Congress, but the temporary Small Defense Plants Administration is certain to be extended for another year. But highly uncertain of acceptance is an SDPA request that it be granted authority to earmark up to 35 per cent of defense procurement for small business. Smaller companies recently have been getting only about 17 per cent of military expenditures.

The Atom Goes Industrial

A major accomplishment of the Eisenhower administration could be the encouragement of the use of private capital in atomic energy developments. The greatest industrial interest now is in atomic power, and a new AEC policy to let more firms explore that peaceable use for nuclear energy will soon be explained to Congress. Detroit Edison Co. and Dow Chemical Co. are already well along in their research.

Straws in the Wind

The Republicans have filled only about 200 of the key 900 jobs in the administration thus far . . . Farm equipment sales are rising more than seasonally . . . Armco Steel Corp. will light its new 1300-ton-a-day blast furnace at Middletown, O., Apr. 14 . . . M. A. Hanna Co. hopes to start shipping ore from its Labrador-Quebec project by late 1954 . . . Fenimore Iron Mines Ltd. plans to mine iron ore in the Labrador tidewater and sell it in the U.S. . . . Personal income in February was at an annual rate of $280.5 billion, unchanged from January.

What Industry Is Doing

Steel, copper and aluminum are nearing a supply-demand balance, although some items are still tight (p. 63) . . . Harvey Machine Co. Inc., Torrance, Calif., is launching a program for integrated aluminum operations (p. 64) . . . President Eisenhower's requests to Congress are winning favorable but cautious consideration (p. 65) . . . Makers of steel fasteners hope to clamp down good sales this year, but the market may loosen in 1954 (p. 66) . . . The transmission chain industry in 1953 is striving to equal last year's exceptionally good sales (p. 67) . . . Machine tool builders, meeting in New York, were unusually optimistic (p. 68) . . . Proposed: A central production board to eliminate waste and duplication of government-owned machine tools now valued at $6 billion (p. 69).

. . . *but*
Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate — without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be SAFE, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!

MARVEL *Metal Cutting* SAWS

Better Machines—Better Blades

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Maybe It's "The Steel In Our Blood" ▸ ▸ ▸

or how Reliance *picked-to-order* Sheet and Strip *fit your job*

To all intents and purposes, *picked-to-order* warehouse steel must do the job for which you buy it just as well as the *rolled-to-order* product your mill might otherwise supply.

We at Reliance don't pretend to be miracle workers but we have met this challenge for going on 30 years.

Maybe it's our "feel for steel." Maybe it's "the steel in our blood!" But mostly it's the Reliance *job-fitting* idea.

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Here's how Dependable Dan boils down the Reliance JOB-FITTING idea . . .

- It's knowing our "stuff"—what our steel can do as well as what it cannot do.
- It's getting to know all we can about your buying preferences and about your particular jobs.
- And then, it's *picking* the stock that best suits your immediate requirements.

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A Better Cure

"Britain's Economic Problem and Its Meaning for America" is the title of a thought-provoking report issued by the Committee for Economic Development. It merits the careful attention of American industrialists, not only because it deals realistically with our relations with our strongest and closest ally, but also because it may suggest a new approach to our problems of economic assistance to other nations.

After tracing Britain's economic problems from the end of World War I down to the present time, the report goes to great lengths to dispel the recent fallacious assumption that Britain's difficulties are a temporary result of the two great wars. Belatedly, Britons and Americans are beginning to realize that Britain's troubles are too deep-rooted to be cured by short-term shots-in-the-arm assistance.

Unfortunately this brutal discovery is raising misgivings on both sides of the Atlantic. "If these tendencies in British and American opinion were allowed to grow," states the report, "they could undermine the present partnership. Under the pressure of economic difficulties British morale could waver and Britain could drift toward neutralism. If these things should happen, the seriousness of the ultimate results both for Britain's and for America's security, and for that of the rest of the world, would be difficult to exaggerate."

It happens that "neutralism" of Britain is one of the Kremlin's main objectives today. Perhaps its present conciliatory policies are aimed at that target. For that and other reasons we should try to better understand Britain's problem and to deal with it more intelligently.

C.E.D. offers numerous recommendations. It points out that British industrial management has been "less vigorous, imaginative and aggressive" than its American and German competitors. British labor has resisted change and progress. These attitudes should be corrected. Britain could be helped by greater investment of American capital in Britain, but here the British should make the opportunities for such investment as favorable as they are in Canada. Above all, opportunities for Britain to export certain products to the United States should be expanded.

In short, private competition, investment and trading may succeed where government assistance has failed.

E. L. Shaner

EDITOR-IN-CHIEF

THESE THINGS WE NEED: Foreign trade is destined to be a hot subject of debate for months to come. As a matter of principle, almost every consideration of federal policy calls for as much freedom in trade as possible. Unfortunately this concept collides head-on with the belief of many employers and employees in certain industries that their products, manufac-

tured with the assistance of highly paid workers, should be protected by tariffs against the competition of poorly paid foreign workers.

Resolving the inevitable conflicts in this field of foreign trade will be exceedingly difficult, but it may be eased somewhat by multiple deals whereby we can import urgently needed strategic materials from countries in Asia or Africa and the dollars thus received can be used to purchase manufactures from European industrial nations which are thirsty for dollars.

We in the United States (p. 73) are dependent 100 per cent upon foreign sources for industrial diamonds, tin and columbium. Ninety per cent or more of our requirements for chromite, nickel, mica, manganese and cobalt come from abroad. Our needs for these and other strategic materials should be integrated into our complex foreign trade problem.

* * *

WASHINGTON GREMLINS: As the first quarter of President Eisenhower's administration draws to a close, there is mounting evidence of the inclination of many officeholders in Washington to resist change. One sees it not only in the attitudes of numerous federal employees but in the pointed questions which many journalists and commentators put to Eisenhower appointees when they appear on radio or television programs.

Many of these individuals have become so thoroughly obsessed with the idea that the federal government is papa and mama to everybody, that they cannot understand why anybody should try to economize, reduce the budget, or require a federal employee to put in a full day's work. Among hundreds of thousands of government wage earners there is an instinctive zeal to oppose every effort of the new administration to cut Washington bureaucracy to size.

As in England, the path from socialism back to sound ground in the United States is a difficult one.

* * *

BALANCE NOT FAR OFF: Estimates of when supplies of important primary metals will overtake demand have been revised many times during the past few years. Today the best information seems to indicate that a balance between supply and demand for copper is on the point of being achieved (p. 63), it will occur in aluminum around midyear, and will take place in the steel industry in the four quarter.

Experts believe that the potential output of steel ingots in 1953 will be approximately 118 million tons and they estimate that actual demand will be about 114 million tons. They figure that the potential supply of copper will be 1.6 million tons, of which demand will account for 1.4 million tons. Aluminum output is expected to be 1.5 million tons, all of which will be consumed.

Should these estimates of consumption prove to be fairly accurate, then 1953 will go down in history as the year in which aluminum succeeded copper as the No. 2 metal.

* * *

WORKER CARELESSNESS: In this week's "Mirrors of Motordom" (p. 77), Floyd Lawrence cites a few instances of how simple mistakes along the assembly line can result in the shipment of an occasional defective car to dealers. Right now automobile manufacturers are forced to take extraordinary precautions against this type of trouble.

One of the basic factors in this situation is the carelessness of some workers. This undoubtedly stems from the acute labor shortage. It is estimated that in Detroit alone, 20,000 more employees are needed right now. This means that there are untold hundreds of men and women employed on jobs they couldn't hold if real competition for jobs existed. The only immediate relief lies in better supervision, more adequate training and painstaking inspection.

* * *

CHANCE FOR INDUSTRY: Last week the Atomic Energy Commission indicated that as a result of several years of study it has formulated a policy which is intended to permit a wider opportunity for private investment in building and operating plants to produce electric power. Details of the policy will be studied by the Senate-House atomic energy committee and in due time hearings on the subject will be conducted. The Eisenhower administration previously had endorsed the peacetime use of atomic energy in principle.

The initiative of AEC in laying the ground work for the participation of industry in the application of atomic energy to nonmilitary uses is commendable. The next step is to draft legislation that will be fair and practical.

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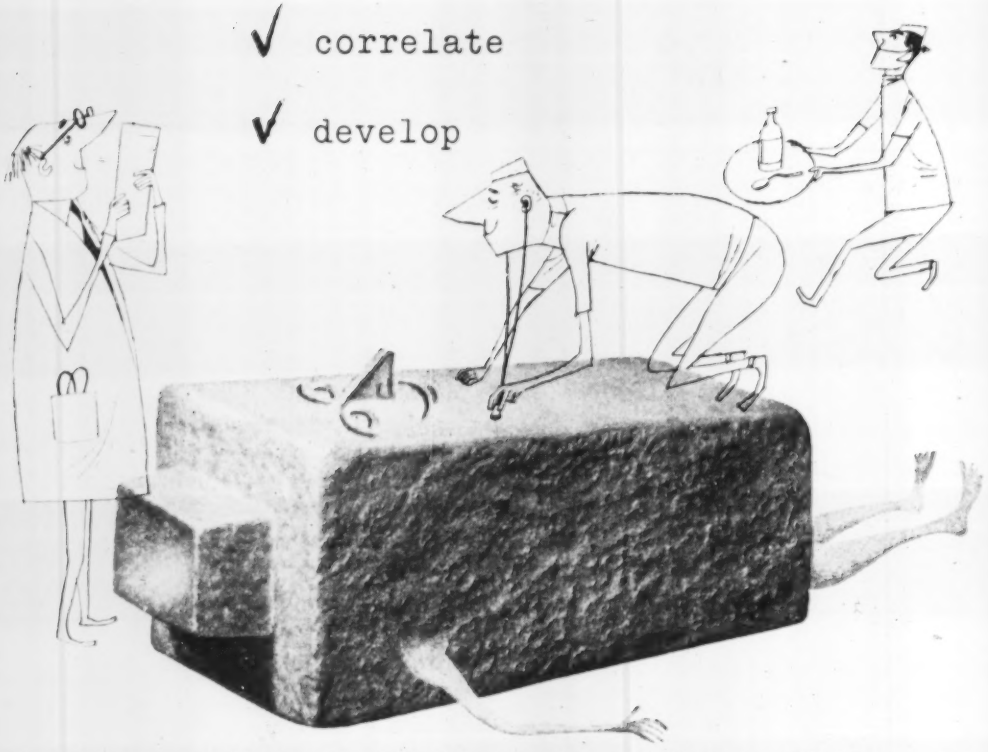

Probing into the structure of ingots is typical of the Inland research that pays off in improved steels for you, such as sheets of better drawing quality and fewer surface defects.

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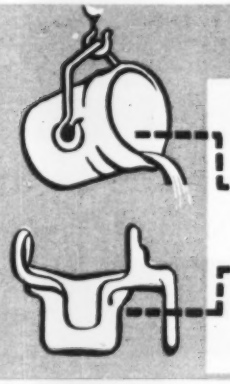


HOW METAL SUPPLY–DEMAND LOOKS FOR 1953

NET TONS	STEEL*	COPPER†	ALUMINUM†
POTENTIAL SUPPLY	118 MILLION	1.6 MILLION	1.5 MILLION
ESTIMATED DEMAND	114 MILLION	1.4 MILLION	1.5 MILLION

*INGOTS †INCLUDES PRIMARY AND SECONDARY DOMESTIC METAL, PLUS IMPORTS

No Glut in Metals, but Supply-Demand Balance Nears

A LOOK in the economic crystal ball today indicates that a supply-demand balance in copper is about here now; it will occur in aluminum around midyear and stay in or near balance for the rest of the year; it will take place in steel in the fourth quarter when the ingot rate could drop as low as 90 per cent of capacity.

The above table indicates that little excess aluminum will be available in 1953. There's some excess copper now. The steel shortage will ease steadily but will still continue through the third quarter. If substantial tonnages of steel go begging this year, such a situation won't result until the fall and winter months.

Prospects — Thus, chances are there'll be no glut in steel or aluminum during 1953. Even in copper the excess of supply over demand is not yet alarming. All current estimates are predicated on the assumption that no major strikes will be pulled among big producers or consumers and that no all-out war will start. The estimates hold even if peace comes to Korea. Korea or no Korea, defense spending will continue high for the cold war, and civilian demand can take up the slack if military expenditures do drop slightly.

Steel—We're producing — and consuming—steel now at the rate of nearly 10 million ingot tons a month. Order books for the second quarter are as heavily loaded as the ore boats starting down the lakes from Duluth. Third quarter bookings are coming in nicely, but the vacation season in that period will probably whittle the ingot rate to about 98 per cent of capacity for July, August and September. In the last three months of 1953 the outlook is haziest, yet even at a conservative 90 per cent of capacity for October, November and December, the ingot rate during the year would still be a healthy 97 per cent average.

That would mean all-time record production of 114 million ingot tons, compared with 93 million in 1952 and 105 million in 1951, the actual peak thus far.

Copper—Price is the key to the supply-demand situation in copper. Few fabricators are crying for copper today; it's doubtful that all April allocations (135,000 tons) will be used. That's not because consumers don't want the metal, but because they don't want it at 34 cents and higher. Domestic copper now brings about 30 cents, foreign about 34. A one-price level in copper at 30 cents would probably lure consumers to take all of the 1.6 million tons that will be available from every source, but it will require some time for the foreign quotations to drop four cents.

Even so, consumption this year will be about 1.4 million tons, slightly better than the 1,389,000 tons consumed in 1952. More copper will be available this year than last because of an estimated 165,000-ton increase in production of free-world mines and an expected jump of 15-20 per cent in imports of the metal.

Aluminum—A tipoff that supply and demand are evening up for aluminum is that imports (immediate delivery at slight or no premiums) go begging. Canadian, British, French, Norwegian and Italian metal is on the market today. But orders are extended for domestic mills 12 to 20 weeks for sheet. Even if many orders are only placed as supply insurance, aluminum producers figure they're in excellent shape until midyear.

They think they're in good condition for the rest of the year, too. After CMP folds, increased civilian use and renewed stockpiling at a heavy rate will take a lot of metal. Producers claim that with potential volume users such as the auto industry, it's not a question of whether they'll use more aluminum, but when. The *when* depends on supply assurance, and that assurance may be forthcoming this summer because civilian industry will have about 300,000 tons more aluminum this year. So even if the military bite on aluminum slips, enough consumption can be generated to take the 1,250,000 tons of primary output, the 150,000 tons of imports and the 100,000 tons of secondary production expected this year.

Crux of the Matter—The real key to demand for steel, copper and aluminum is civilian requirements, not military. The defense bite in

1953 will be only 12 per cent on steel, 20 per cent on copper and 25 per cent on aluminum.

And the crucial factor in civilian markets is automobiles. Pessimists claim the automakers can't keep it up, but those manufacturers have fooled the soothsayers before and they're currently producing at a near-record rate of 6.5 million cars a year.

High Alloy Casters Worried

Members of the high alloy steel castings industry informed the National Production Authority that additional quantities of primary nickel or nickel alloy purchase scrap must be made available to the industry if it is to meet requirements of its customers.

The industry, which is composed mostly of small business concerns, is unable to meet the competition of other metalworking industries for scarce nickel scrap since price ceilings were removed. The price has nearly doubled since then.

The committee members estimated that at least 25 per cent of their nickel requirements should come from scrap. In 1951, they obtained a peak of 54 per cent from that source, but in December, 1952, they dropped to a low of 4 per cent.

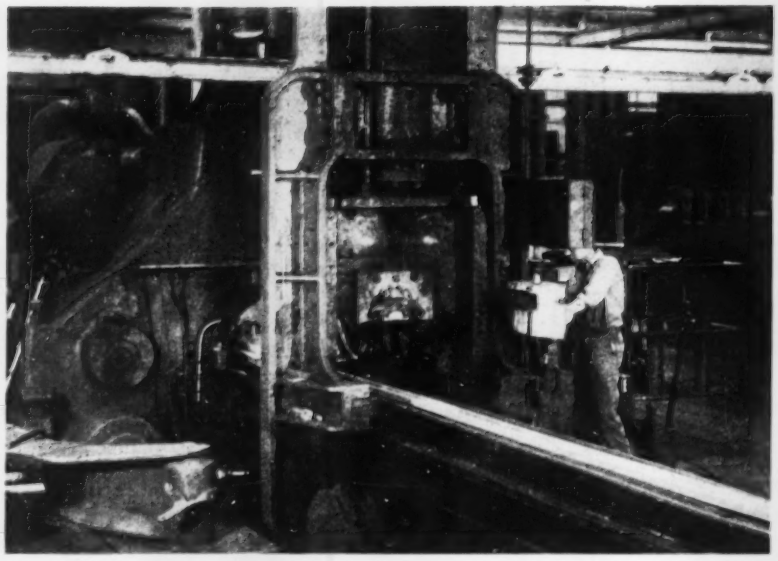
Wheland Gets Large Write-off

Wheland Co., Chattanooga, Tenn., received the second largest certificate with the highest percentage of fast amortization granted by Office of Defense Mobilization from Mar. 12 to Mar. 25. In all, 148 certificates for new or expanded facilities worth over $204 million were issued.

Wheland's certificate was for an alumina plant costing about $22 million, of which 85 per cent will be allowed rapid tax amortization. Site of the plant has not yet been disclosed.

The other two of the top three certificates were to chemical companies for additional facilities to produce phosphatic fertilizers used in food production. More than half the certificates were for less than $250,000; 66 were for small businesses.

Total value of certificates issued to date is $25,681,973,000, for 16,191 new or expanded facilities.



SINCE WORLD WAR II HARVEY HAS MADE ALUMINUM EXTRUSIONS
. . . it's also experimenting with steel extrusions in this same type furnace

Harvey Integrates Aluminum Operations

The company launches a program that will put it in mining, refining and additional fabrication activities by the end of next year

HARVEY ALUMINUM Division of the 40-year old Harvey Machine Co. Inc., Torrance, Calif., promises to become the major part of the Harvey operations soon.

Now scheduled or underway are these projects which will add to Harvey's aluminum facilities: South American bauxite mining, an experimental plant for extraction of alumina from clay, an aluminum reduction plant, a $20 million aluminum rolling mill and a heavy press program. The company will eventually have an annual primary aluminum capacity of 54,000 tons annually and will be the nation's sixth producer. (For details on total industry expansion, which will mean production at an annual rate of 1,650,550 tons by mid-1954, see STEEL, Mar. 23, p. 58.)

Integration—As part of its plan for future integration of aluminum producing facilities, Vice President Laurence Harvey says the company is negotiating for bauxite bearing property in British Guiana and plans to conduct large scale mining operations there. It wants domestic raw material sources, too. A step in that direction was acquisition of the government-built experimental plant at Salem, Oreg., where study will continue on processes to extract alumina from the clays of the Columbia river basin, and for the processing of industrial chemicals.

If Harvey is successful in operating economically on the 30 per cent average yield of alumina expected from the clays, it will have a fully integrated domestic production system. The high 70 per cent refuse rate compares with about 45 per cent encountered in South American bauxite.

Keystone—The biggest factor in integration for the company is the proposed reduction and refining plant at The Dalles, Oreg. Construction is scheduled to begin within 6 months there on the facility which will have the capacity to produce 54,000 net tons of aluminum per year after it is completed by the end of 1954. A certificate of necessity for $65 million was granted last December for the privately financed plant.

Low-cost electric power influ-

enced Harvey in picking Oregon as the site for its reduction plant. That factor influenced other aluminum producers, too, and the Pacific Northwest now accounts for 43 per cent of the nation's primary aluminum capacity. To get its power from the Bonneville Power Administration, Harvey is not expected to aggravate the electricity shortage in the Columbia river region because by the time its plant gets into production there will be enough new generating capacity.

Fabricating—Harvey is already substantially involved in aluminum fabrication. Since 1945 when it started an aluminum extrusion division in Torrance, steady growth has shot that division into third place among the nation's producers of aluminum extrusions. The company markets its extrusions to both civilian and defense customers in about equal proportions. A large military use has been for wing spars and fittings in Air Force and Navy aircraft.

The already established fabricating part of Harvey's activities in aluminum will be rounded out with a $20 million continuous strip mill at Torrance for rolling 60-inch hot strip. The mill, including special heat treating equipment for the production of aircraft alloys, will be the first such facility in California. To produce aluminum sheets, strips and circular shapes, the mill is part of the expansion goal set by the government for increasing aluminum output close to West Coast aircraft plants which build 60 per cent of the U. S. planes. Completion of this facility is scheduled within 18 months.

Heavy Side — Also planned for early construction in Torrance is a heavy forging and extrusion press plant of 600,000 square feet for production of large, high strength aircraft structural components. The facility will house four of the 19 heavy presses in the Air Force press program.

The fabricating part of Harvey's aluminum business will eventually be clustered around Torrance—the press facility in a new 65-acre area adjacent to more than 100 acres, now the site of the regular extrusion division and two other Harvey divisions and soon to be the site of the new mill.

Eisenhower Courts Congress

Congressional scoreboard shows the President's proposals usually meet favorable but cautious consideration. But his recommendations on controls and taxes stir opposition

HOW IS President Eisenhower faring in his efforts to win the good will and co-operation of Congress? The answer is: Fairly well. Of his 19 requests to Congress to date, two have been granted and one rejected. Partial action has been taken on five others. No action has been taken on the remaining 11.

Congress granted the President's request for extension of authority to reorganize executive departments, subject to rejection of individual reorganization plans by Congress. A second request allowed was for revamping the Federal Security Administration and establisment of a Department of Health, Education & Welfare.

Thumbs Down—Congress turned down a presidential proposal to reject "interpretations" of commitments contained in secret understandings with foreign governments which permit enslavement of peoples. Congressional leaders thought the resolution should call for "repudiation" of these secret agreements, and in the resulting confusion the matter was dropped.

Hearings have been held on Taft-Hartley amendments, on rent control renewal and on renewal of defense priority and scarce material controls. The Senate Banking Committee has put finishing touches on a measure — S. 1081 — which would continue until June 30, 1955, authority for priorities and allocation of critical materials.

Continued Controls — Entitled "Defense Production and Temporary Controls Act of 1953," the bill would continue until June 30, 1955, government authority to encourage minerals and metals development and would give the Federal Reserve Board stand-by authority to that date to impose controls on housing and consumer credit.

A proposal to allow the President to freeze wages, prices and rents for a 90-day period in case of emergency and to grant Eisenhower's request to extend rent controls until Oct. 1, 1953, is under congressional consideration. Predictions are that the controls bill as now shaping up will pass the Senate but fail in the House.

A serious controversy may be developing in regard to taxes. The President insists the time has not come to reduce taxes, but there is a strong trend in the House to do just that. Another major difference is in reference to stand-by wage, price and rent controls. Eisenhower doesn't want such a law but many in Congress want it in case of all-out war.

Satisfactory Relations—Observers believe the President is receiving the normal amount of co-operation from Congress. His relations with that body are distinctly friendly. At the same time, difficulties to date (particularly opposition to his appointments of Charles E. Wilson and Charles Bohlen) prove that he is not dealing with a rubber-stamp Congress.

India Dedicates Its 'TVA'

Prime Minister Nehru (right) lauded American engineers and technical skills at the dedication of the first unit of India's Bokaro steam power plant near Calcutta. Listening was Harry A. Kuljian (left), Philadelphia engineer, whose firm designed the $35 million power project on the Damodar river

Fastener Sales Climb

Fastener manufacturers enjoy heavy sales to jobbers, automakers, but lags may develop this year, particularly in rivets

"GOOD FOR THIS year, but with sore spots in the future"—that's the outlook in steel fasteners, an industry which consistently mirrors general business conditions. Manufacturers will clamp down good sales this year, better than last, but their hold on the market may loosen in 1954.

Steel supplies are improving, there are no fundamental defects in the fastener trade and industry expects a record dollar volume of construction in 1953, pointing to a successful year. When industry builds, it needs nuts and bolts, screws and rivets to hold installations together. However, demand is falling off among such good customers as the railroad industry.

More for Autos—On the brighter side, Detroit is buying fasteners in record quantity for accelerated automobile production. The aircraft industry needs more nuts and bolts for engines, and structural steel enterprises continue to be heavy buyers of rivets.

Auto manufacturers will continue to use greater numbers of fasteners for production and repair this year, the Industrial Fasteners Institute reports. Detroit uses many special designs of headed and threaded products, besides being great users of standardized types. The average car, with 15,000 parts, has thousands of fasteners. Of one type of screw, General Motors Corp. uses above 100 million a month. Chandler Products Corp., Cleveland, says demand for the company's bolts from the motor city is 25 to 50 per cent above last year's sales.

Jobbers—Auto mechanics, needing very small amounts of fasteners at one time, customarily buy from automotive replacement jobbers. Most of these purchase fasteners from manufacturers in standard packages. Jobbers are finding a steadily improving market in auto and truck dealers, service stations, companies maintaining their own trucks and repairers of tractors and farm equipment. Replacement of parts will continue to be profitable as more equipment comes into use, and used more often.

Another growing customer for fasteners is the aircraft industry. Stainless steels, heat-resistant to withstand high temperatures in jet planes, are being developed for engine bolts. Although production schedules may be streched out, aircraft sales should be high for several years. A switch from military to civilian production wouldn't affect fastener-makers greatly.

Mechanization of Farms—As farm machinery takes the place of the horse, farmers require more nuts and bolts for repair to trucks and tractors. Their work is done under rough conditions, so replacement parts are needed steadily. Farm machines use at least 5000 types and sizes of fasteners.

While the sales outlook is encouraging in the immediate future, troublesome forecasts are being made, particularly by rivet producers. Champion Rivet Co., Cleveland, states that sales to railroad companies for freight car construction are below par. A Pittsburgh manufacturer says his sales to structural steel enterprises are falling off. "There was a flurry of rivet sales after the steel strike ended, but now a downtrend is starting," a midwestern operator reports.

Pressure for Sales—Working quickly to prevent a recession, manufacturers of rivets are trying to bring about savings of materials in production, while increasing sales campaigns. "Supplies, such as wire, have improved," says Milford Rivet & Machine Co., Milford, Conn., affirming the general opinion that sales are the greatest problem.

A shot in the arm for the fastener industry is the accelerated use of high tensile bolts. Rivets and common bolts are usually made of carbon steel. High tensile bolts of heat-treated steel are turned up very tight with a torque wrench or air-driven impact wrench. The clamping force between bolt and nut holds steel joints together very firmly.

High tensile bolts are being used in bridges where service conditions are severe and in field construction.

Business Conditions—Consensus among fastener manufacturers is shown by this typical comment: "We feel that business will continue to be there, but after this year, we'll have to exert more sales pressure to go after it."

Manganese Research Widened

"Wad" ores of New Mexico and Arizona are now included in the government's attempt to find an economical method of converting low grade domestic manganese ore to a product that can be used by the steel industry.

The contract for the research between Defense Materials Procurement Agency and Southwestern Engineering Co., Los Angeles, formerly included only wad ores from Virginia and Arkansas and Aroostook manganese deposits in Maine. There are large deposits of wad ores in the United States. If a practical method can be found to separate the small particles of manganese from other materials in the ore, it will help reduce American dependence upon foreign sources for the important metal.

The U. S. now uses about 2 million tons of manganese a year, about 90 per cent of it imported.

President Favors Trade Act

President Eisenhower favors a one-year extension without major changes of the Trade Agreements Act, due to expire June 12. He says there isn't time enough for the study which a complete revision would require.

House Speaker Joseph Martin (Rep., Mass.) says he, too, feels that a one-year extension is in order. The House Ways & Means Committee will begin hearings on Apr. 22 on H.R. 4292 which would extend the act for one year but reduce the President's discretion in dealing with tariffs. It would make

it mandatory instead of optional for him to accept recommendations of the Tariff Commission in regard to peril points and damage to domestic industries through undue tariff reductions.

Security Regulations Clarified

The matter of security in plants doing defense contract work came in for clarification by the Munitions Board last week. It ruled that a defense contractor cannot revoke a "restricted" or "confidential" security clearance granted an employee even if the contractor finds the employee to be a security risk.

The proper procedure is for the employer to pass his evidence on to the contracting officer. He must then wait for action until he hears from the contracting officer or the Army, Navy or Air Force Personnel Security Board.

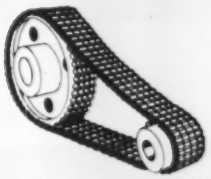
Munitions Board also approved reduction to pulp as an alternate method to burning for destruction of printed or written classified security information. Security officers will designate the type of equipment which may be used for this purpose.

Finally, the secretary of defense has directed that the Armed Forces Industrial Security Regulation approved by the Munitions Board Jan. 15, 1953, be adopted as a regulation of the Department of Defense, thus establishing a single regulation for the industrial security policies and procedures of the three armed services.

Dow To Start Rolling

Dow Chemical Co.'s program to concentrate all magnesium rolling and extrusion facilities at its Madison, Ill., operations will have the heavy rolling equipment operating this fall with the other additions scheduled for completion by mid-1954.

The new setup at Madison includes alloy ingot production facilities and warehouse area. Extrusion equipment includes press capacities of 13,200 tons down to 250 tons. Four-high rolling mills will be used. Coil rolling equipment includes an 84-inch, four-high, hot-breakdown mill and 84, 68, 66, 36, and 18-inch, four-high, mills for cold finishing.



Chain Drives

Heavier Loads, Faster Speeds Are Still the Coming Trend

"WHEREVER there's a smokestack, there's a chain used."

That's an old saying in the transmission chain industry which is taking on a new meaning in 1953. With the exception of the six months prior to Korea, the industry has enjoyed a seller's market since World War II. This year, chain makers look for a change to a buyer's market; every smokestack will then represent a customer worth going after.

Shooting for Par — Increased competition should not hurt sales, though. Dollar sales this year are expected to be on a par with 1952, or a little better, chain makers report. In 1952, sales were up 20 per cent over 1951 in some cases.

Since Korea, sales have been tied closely to materials supplies. Defense needs and then the steel strike cut into the materials available and thus into sales. Now, steel is becoming noticeably easier; the worst that can be said is that some items are in spotty supply. These would include high carbon plates, high carbon bars, certain strict analyses of strip, and specialties like monel, stainless steel and nickel-bearing grades.

Heavier and Faster—How are transmission chain manufacturers planning to meet the day of better steel supply and increased competition? Mainly, through product improvement. While industry-shaking new developments are a rarity in the chain drive industry, constant improvement and modification is the rule. There is a continuing trend toward chain which will transmit heavier horsepower loads at faster speeds. Morse Chain Co.'s Hy-Vo chain has reportedly transmitted between 1000 and 2000 hp at speeds up to 6500 feet per minute, says I. A. Horton, sales promotion manager for the company. This type of chain, a modified silent chain, hasn't become standard yet but may some day soon. Other companies report they, too, are working on chains to deliver heavier loads faster.

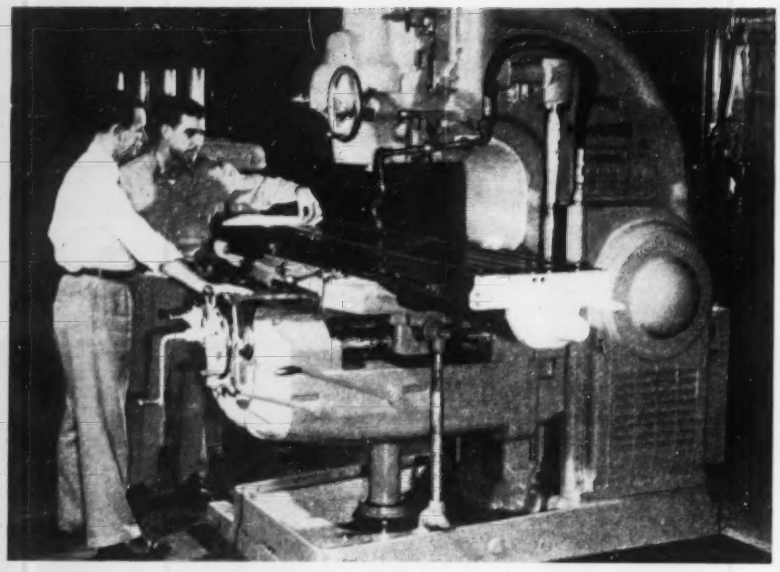
Non-s p a r k i n g, non-corrosive, non-magnetic chains are being developed; alloy steel chains for longer life; interchangeable hubs for sprockets are now available.

Steady Prices—They all add up to better performance for the customer and a slight competitive edge for the manufacturer. Price cutting is another customary sign of tight competition. There are no indications that chain makers are using this expedient yet, however.

About 25 companies make drive chain—five major manufacturers of silent chain, six makers of roller chain and four producers of heavy engineering chain. The remainder are component or lesser producers. Distribution of chain varies with the section of the country being considered. For example, in New England, about 30 per cent of drive chain production is sold through mill supply or industrial supply houses. In the Detroit area, much of the chain is sold through manufacturer's agents and, for the Midwest as a whole, about 60 per cent of the chain goes directly to original equipment manufacturers.

Buoyant Market—Over-all, new equipment is a large user of drive chain and that is one reason for continued buoyancy in the chain market. As George Bee, sales manager, Palmer-Bee Co., Detroit, puts it: "Management has given large appropriations for plant equipment and improvement. That's where chain comes in."

Does the prospect of increased competition have chain makers worried? "The outlook for 1953 is very good," says R. H. Sager, general manager, Simonds Gear & Mfg. Co., Pittsburgh. And most chain makers roll right along with that opinion.



Rebuilding Machine Tools at Boeing Plant

Careful checking and testing plays an important part of Boeing Airplane Co.'s tool rebuilding program. About 17 World War II machines are rebuilt in the company's Wichita, Kans., division each month. New production line procedures help restore old, worn machines to original specifications at a low cost

Good Business Ahead, if—

Machine tool builders, meeting in New York, are unusually optimistic, provided sound U. S. policies are adopted and the Vance plan is accepted

MACHINE TOOL builders are optimistic about their outlook, although realizing that heavy competition lies ahead.

"If the present administration fulfills its promise to encourage competitive enterprise and if initiative is rewarded, I think there will be a wave of intense competition such as this country has not seen in years." So said Swan E. Bergstrom, president of the National Machine Tool Builders Association in his opening address at the group's spring meeting in New York last week.

Lower Cost—"The big question the country over," Mr. Bergstrom continued, "will be: How can we get our costs down so that more people can buy our product? That is where the machine tool industry comes squarely into the picture. Our industry is the basis of all industrial productivity, and we have what it takes to cut costs."

Mr. Bergstrom, vice president of Cincinnati Milling Machine Co., Cincinnati, cited such problems of concern to the industry as the need for revision of present Internal Revenue department provisions about depreciation and the necessity of removing restrictions which block sales of American-made machine tools to foreign countries. He also emphasized the need for revision of tax policies which discourage the venture of risk capital.

Shadow Plants — Together with the industry's interest in administration policies is its acceptance of the Vance plan. So far this is simply a report submitted to the Office of Defense Mobilization. Before it becomes official it will have to be approved by the armed forces and by Congress.

The plan proposes installation of "shadow plants" instead of building up vast supplies of planes, tanks and guns. Production equipment to fill the standby plants would be in the stewardship of a manufacturer and could be used for manufacture of peacetime goods while awaiting conversion to defense production. Ralph S. Howe, executive vice president of New Britain Machine Co., New Britain, Conn., states that the plan would avoid stockpiling more than a reserve to withstand the first impact of war.

No Emergency—This plan suggests that national defense is not an emergency proposition but may be a continuing problem to face in the future. Tool builders feel that the Vance plan, or one like it, will be the answer to their problems. They are overwhelmingly opposed to wholesale stockpiling of machines, partly because the machines are often obsolete before they can be brought into service. (For more details on shadow plants, see p. 70.)

Many machine tool order boards show a trend away from defense goods into the consumer field. At present the split is about 50-50. One large manufacturer says that incoming orders are about 60 per cent civilian.

The industry is hard at work now on standardization plans. Tell Berna, general manager of the association, reported on work in the fields of electrical, hydraulic and mechanical press, hydraulic and training standards.

New Controls Taking Shape

The controls picture after June 30 is getting more shape as National Production Authority prepares two more orders. The first will be a revision of Regulation 1, the inventory control order, which will be issued soon.

In effect, the revision will eliminate inventory controls over most of the materials not covered by the Controlled Materials Plan, thus conforming to the new criteria for retaining controls over only those commodity areas in which the impact of military demand has created a strained supply situation.

The second action will be to revise NPA Order M-103 to limit the percentage of the output of diamond abrasive wheels which will be earmarked for defense-rated orders. At present, the entire output goes for defense.

Both revisions will be issued as NPA orders, but they are being written with a view to continuance after June 30 under the Defense Materials System.

Plan Central Tool Board

Congressional proposal would eliminate waste of U. S. machine tool inventories

A MUCH-DISCUSSED proposal to establish a governmental central machine tool agency has been referred to President Eisenhower, who assigned a staff assistant to make an investigation.

In a letter to the President, Rep. Paul Shafer (Rep., Mich.), chairman of a House Armed Services subcommittee, pointed out that the government owns more than 500,000 machine tools and other items of production equipment, representing an outlay of about $6 billion of taxpayers' money.

Wasted Equipment?—Rep. Shafer says that facts brought to the subcommittee's attention raise the question of whether this equipment is being used with full effectiveness. There have been instances, he continues, where the armed services purchased tools although the government's inventory of idle tools contained identical items.

Specifically, Rep. Shafer asked the President, if findings warrant, to appoint a special committee to insure that tools owned by the government are used effectively.

Permanent Board—This committee, Rep. Shafer suggests, may find the best approach toward that goal to be creation of a "central machine tool board" or "central production equipment board." The new group would inventory, catalog and maintain government-owned equipment, lease it to contractors, including allocation to government plants, and possibly handle all government procurement of such equipment.

Rep. Shafer will not schedule subcommittee hearings on the proposal until he has a definite reply from the White House.

Renegotiation Rules Changed

Manufacturers involved in subcontract sales of machine tools and other long-lived equipment will be interested in Staff Bulletin No. 7 in which the Renegotiation Board explains the processing of cases under the recent change in its regulations.

The change reduces the part of the subcontract price which is subject to renegotiation by taking into account the percentage of time that the equipment is expected to be used in renegotiable production during the first 12 months following its delivery to the user.

Staff Bulletin No. 16 explains the board's ruling that when a defense contractor is required to refund excessive profits to the government, he may pay the refund in installments when payment in a single sum would impose undue hardship. Both bulletins are available from the superintendent of documents, Government Printing Office, Washington 25, for 5 cents apiece.

For Service Call 3033

Two-way radio communication is an innovation in overhead cranes at the Georgia Division plant of Lockheed Aircraft Corp., Burbank, Calif. Speeding production of Boeing B-47 Stratojet bombers, radio equipment permits quicker dispatching in the 45-acre plant. A telephone call to the radio control booth brings quick service

CHECKLIST ON CONTROLS

Materials Order

TUNGSTEN STEEL—Simultaneous revocation on Apr. 6, 1953, of Schedule B of NPA Order M-80 and NPA Order M-81 removed restriction on monthly production of high speed steel containing a high tungsten content and abolished use control over pure tungsten and pure molybdenum.

Mineral Order

ZINC EXPORTS—Revocation of Mineral Order 3 on April 3, 1953, removed controls over the exporting of zinc.

Appointments in Washington

J. B. Coffinberry, Republic Steel Corp., was appointed chief of the Sheet, Strip & Tin Mill Products Section, Iron & Steel Division, National Production Authority.

Kenneth M. Smith, National Malleable & Steel Castings Co., Cleveland, was named chief of the Castings Section, Iron & Steel Division, NPA.

George A. Sands, Electro Metallurgical Co., New York, was appointed assistant director for ferroalloys, Iron & Steel Division, NPA.

W. P. Gideon, Tennessee Coal & Iron Division, U. S. Steel Corp., was designated chief of the Plate Section, Iron & Steel Division, NPA.

Fred G. Brown, Weirton Steel Co., was named chairman of the Production Directive Committee, Iron & Steel Division, NPA.

James M. Mitchell was appointed civilian deputy to the assistant secretary of defense (manpower & personnel), Department of Defense.

Kenton R. Cravens, St. Louis, was named administrator of the Reconstruction Finance Corp.

Trims Justice Department

Most impressive purge by the Eisenhower administration to date has occurred in the Justice department. Upwards of 60 attorneys have been dismissed from its staff and the ousters are continuing.

Attorney General Herbert Brownell is recruiting a new staff on which he can rely to carry out administration policies to the letter.

SELECTED DEFENSE CONTRACTS IN EXCESS OF $100,000

PRODUCT	CONTRACTOR
Trucks, Fork, Gasoline	Yale & Towne Mfg. Co., New York
Tractors, Crawler	International Harvester Co., Chicago
Motor Vehicle Parts	American Generator & Armature Co., Chicago
Combat Vehicle Parts	Minneapolis-Honeywell Regulator Co., Minneapolis
Shells, 155 mm	Westinghouse Electric Corp., Pittsburgh
Shells, 105 mm	National Pressure Cooker Co., Eau Claire, Wis.
Shells, Mortar, 81 mm	Lloyd Mfg. Co., Menominee, Mich.
Bombs	Temco Inc., Nashville, Tenn.
Range Finders	Chrysler Corp., Detroit
Fuzes	Supreme Knitting Machine Co. Inc., Brooklyn, N. Y.
Aircraft Pumps	Thompson Products Inc., Cleveland
Primers & Carburetors	Bendix Aviation Corp., Detroit
Cylinders	Besler Corp., Emeryville, Calif.
Pumps for Ships	Warren Steam Pump Co. Inc., Warren, Mass.
Tube Axial Fans	L. J. Wing Mfg. Co., Linden, N. J.
Kit Heaters, Personnel	Stewart-Warner Corp., Chicago
Elevator Machinery	Westinghouse Electric Corp., Pittsburgh
Lockers	Bristol Sheet Metal Co., Middletown, Conn.
Radiographic Units	Westinghouse Electric Corp., Pittsburgh

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Defense department studies optimum use of shadow plants and multiple-source plants. Congressional economy drive may cut into scope of the mobilization base

CONGRESSIONAL efforts to cut $4 billion from the defense program may mean revising the scope of the mobilization base downward. "Shadow plants" and "multiple-source" plants are involved.

At least 50 shadow plants are on the boards including ten to 12 for building "elephant" machine tools, ten to 12 foundries capable of producing cast steel armor, several gage plants and about six plants for producing forgings for ship propulsion machinery. In addition, a considerable increase in facilities for producing cutting tools is planned.

End-Items — Multiple-source plants, like the tank plants that already have been created, would produce duplicate military end-items. They would be available for quick expansion in production of those items. Planners would have installations spread over the country to prevent paralysis of production in event of enemy attacks.

When Charles E. Wilson, defense secretary, was asked at a recent press conference about plans for cutting expenditures in his department, he said, "We don't want to spend the nation's money for something we don't need to do now. We are looking over expenditures carefully to avoid spending money for a big theoretical capacity that we may not need."

Fight Tariff Cuts . . .

A new lobbying group, attempting "the largest effort yet made to block tariff reduction," has been set up in Washington. Named the Nationwide Committee of Industry, Agriculture and Labor on Import-Export Policy, its chairman is O. R. Strackbein, 815 15th St. N. W., Washington.

Among industries represented are chemicals, coal, dairy products, glassware, bicycles and wool production. The committee will wage a grass-roots campaign, contact Congress and undertake an educational program of radio and TV addresses to win public approval of its objective, prevention of further injurious lowering of tariffs by the government.

Heads Atomic Energy Group . . .

Newly-elected successor to the late Brien McMahon as chairman of the Joint Congressional Committee on Atomic Energy is Rep. W. Sterling Cole (Rep., N. Y.). Under a rotational arrangement Mr. Cole will serve for the remainder of this Congress, to be succeeded for a two-year period by a member of the Senate.

FTC Speed-up . . .

"We must speed up our procedures and dispose of cases promptly." That's the word from the new chairman of the Federal Trade Commission, Edward F. Howrey. Saying that the efficiency of any organization is dependent upon the morale, loyalty and earnestness of its employees, he called on the commission's personnel for teamwork "to keep advertising truthful, to prevent false and deceptive trade practices and to halt monopolistic tendencies."

Mr. Howrey added that he subscribes to the high purposes for which the commission was established and the laws which it administers.

Review Social Security . . .

The entire social security system will be studied by a new House Ways and Means subcommittee preparing revisions to be submitted to Congress in 1954.

Another subcommittee will conduct a parallel study of the unemployment compensation insurance program for revision next year. Meanwhile the White House is preparing a request that Congress extend old-age and survivors' insurance to farmers and professional classes not now covered.

Proposed ODM Chief

Arthur S. Flemming, on leave as president of Ohio Wesleyan University, was nominated as director of the Office of Defense Mobilization by President Eisenhower. The Senate is expected to confirm his appointment. Under a presidential proposal, ODM would become a statutory agency with functions of the National Security Resources Board and authority to fix governmental stockpiling policy

Funds for Fellowships . . .

The National Science Foundation awarded 556 graduate fellowships in the natural sciences for the academic year 1953-54.

Stipends to fellows range from $1400 for the first year of graduate study to $3400 a year for post-doctoral fellows.

Agriculture Cuts Costs . . .

Responding to the President's request for economies in all government departments, Secretary of Agriculture Ezra Benson has cut $130.8 million from his budget for fiscal 1954.

The Truman budget called for $1,324,600,000; Benson is asking $1,193,800,000.

Baker 6000-lb. Fork Truck stacks Ford engine blocks in temporary storage. Next move is to engine plant.
THE BAKER-RAULANG CO
1853 100th anniversary 1953
THE BAKER-RAULANG CO.

New Ford Foundry speeds handling with BAKER TRUCKS

A sizeable fleet of Baker 6000-lb. capacity Fork Trucks helps maintain the production pace in the new Cleveland Ford foundry. The trucks are of the "FT" type, designed for 100% functional, efficient, safe, low-maintenance operation. They are used interchangeably on a wide variety of jobs, moving many materials that cannot be piped, conveyed or transported by other automatic methods. Most such materials are palletized for fork-truck handling.

They unload incoming bulk materials such as sea coal, bond, drums of oil and other liquids, tier them in storage or in areas near their points of use. They haul supplies to metal and molding departments and to other production operations. They haul finished products from ends of production lines to scales for weighing, and then to storage. Palletized engine blocks are taken from conveyors to temporary storage awaiting transfer to adjacent engine plant. They load cast flywheels onto highway carriers for shipment to the Ford Rouge plant.

write for your copy of the "Baker Handling Library", a portfolio of case histories showing actual cost savings in foundries and other plants.

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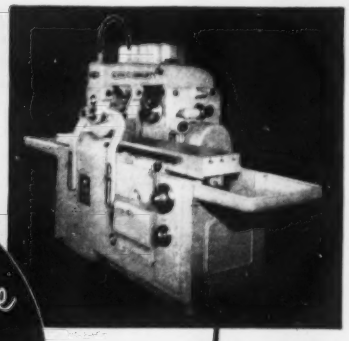
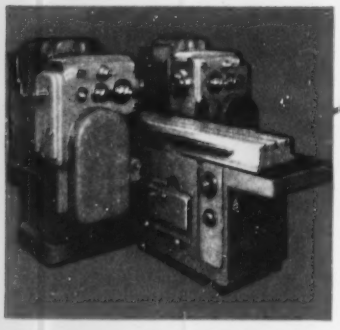
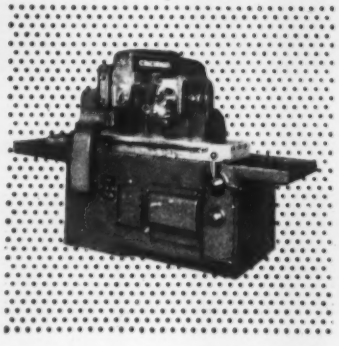


Plain style, CINCINNATI No. 2-24 Automatic Milling Machine.

three styles of the NEW CINCINNATI NO. 2-24 AUTOMATIC

Duplex style, CINCINNATI No. 2-24 Automatic Milling Machine.





Plain Rise and Fall style, CINCINNATI No. 2-24 Automatic Milling Machine.

"What does the customer want?" These words have always guided Cincinnati Milling's machine design policy, from the first knee-type built 69 years ago to the latest bed type . . . the No. 2-24 Automatics. These new machines combine advanced production features with more convenient means of setting up the job. They are built in three styles: Plain, Duplex, and Plain Rise and Fall. All have . . .

Automatic Two-Way Table Feed Cycles for one-way milling; for reciprocal milling with midway safety stop position. Controlled through . . .

Cycle Selectors, a small cam shaft unit which can be removed and replaced in less than a minute. Units have been designed for almost every conceivable automatic cycle. In addition to table and spindle carrier, cycle selectors initiate other automatic functions including . . .

Automatic Backlash Eliminator—It automatically engages during feed stroke; automatically releases during rapid traverse. Another feature of value in modern metalworking practice is . . .

Automatic Spindle Stop—When the table stops for loading and unloading the fixture, the spindle stops rotating. To the production advantages gained through these automatic features, add . . .

Single Control Lever—Starts the complete automatic cycle, and controls . . .

Power Manual Traverse of table and spindle carrier; a labor-aiding convenience for setting up the machine. To top it off . . .

Dynapoise Overarm, a built-in feature that chokes self-excited chatter, smoothing out the cutting action.

With new CINCINNATI No. 2-24 Automatics, metalworking shops everywhere can reduce the cost of milling operations, within 3 hp and 5 hp range, on a wide variety of parts manufactured in medium to infinite quantities. For brief data, look in Sweet's Catalog File, or if you want complete information, write for new 28-page catalog, No. M-1760.

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STRATEGIC MATERIALS—

We Depend on Foreign Sources for These Amounts

Source: Defense Production Administration and U. S. Bureau of Mines

U. S. Leans on Foreign Raw Materials

Defense Production Administration figures show the trend toward U. S. dependence on foreign materials is continuing. Opening new sources of supply brings investment problems

THE MANUFACTURING colossus of the world may soon be standing on shaky legs.

Through a combination of rapid consumption of domestic raw materials and technological developments which demand new materials, American manufacturers have come to lean on foreign-produced supplies. This country became a net importer of raw materials during the 1940s. In 1950 the weight of dependence had increased and is likely to increase further. Each year 2.5 billion tons of raw materials are used up to support our high standard of living.

Lagging Investments—Yet, investments in foreign sources of raw materials have lagged behind. The President's Materials Policy Commission (Paley commission) estimates that, for copper requirements of U. S. industry alone, an annual investment aboard of $100 million will be needed over the next several years. U. S. private investment in foreign mining and smelting activities since World War II has averaged only approximately $50 million a year.

To point up the discrepancy, the Defense Production Administration has reported the percentages of total U. S. consumption which are based on imports for certain strategic materials (see the chart).

Unobtrusive But Important—Uses and sources of some of the materials listed are not as apparent as copper, lead and tin. **Columbium,** for example, comes chiefly from Nigeria and, in alloy form, is used in jet engines, gas turbines, rockets and similar devices. **Ilmenite,** supplied to us mostly from India, is the principal ore of titanium along with **rutile. Mica** coming from India and Brazil in muscovite mica, block film and splitting form and from Madagascar and Canada in phlogopite mica form, has multiple uses in electronic tubes, mica capacitators, magnetos and electrical insulation. **Manganese,** from India, **nickel,** from Canada, and **tungsten,** from Bolivia, Portugal, Spain, Brazil, Thailand, Malaya, Burma, Korea and Australia, all have important uses in steelmaking.

The U. S. government is trying by several methods to insure and increase American investment in foreign sources of raw materials. And U. S. industry is responding where it is economically feasible to do so. But, one of the biggest obstacles to overcome is the feeling of independence on both sides of the oceans.

Aries Goes to Tokyo

Titanium dioxide will be produced, beginning in late 1953, under an agreement between Nippon Titanium Co. Inc., Tokyo, and R. S. Aries & Associates, New York. Nippon Titanium already is one of the larger Japanese producers of this pigment, but the Aries process makes high quality production possible with smaller plant capacity.

The agreement provides for stock ownership participation in the Nippon company by Aries.

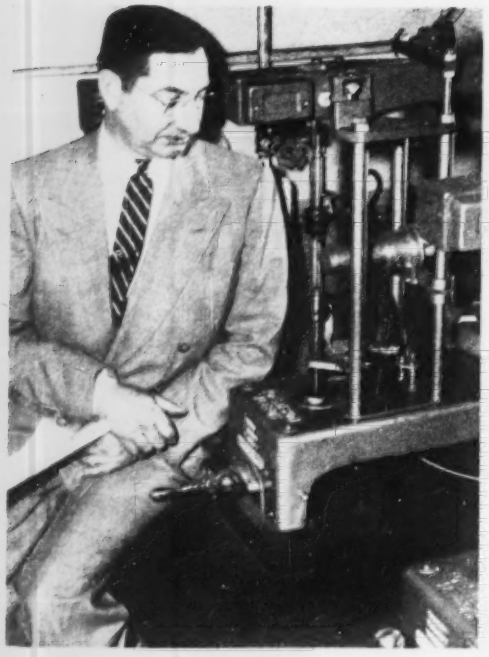
U.S. Furnaces for Australia

James H. Knapp Co., Los Angeles, shipped two heat-treating and aging furnaces to the Commonwealth Aircraft Corp. Ltd., Port Melbourne, Australia, to be used in manufacturing aircraft for the Royal Australian Air Force. Ever since World War II, when Australia was practically cut off from the rest of the free world, that country has been trying to become industrially independent.

The furnaces consisted of an aluminum heat-treating quick-quench furnace and an aluminum aging oven. Both were shipped completely bricked, although they weighed 37 tons and 7 tons respectively.

Offshore Pickups

Television is hitting its stride in Italy, say Westinghouse Electric Corp. representatives there. Sixty thousand receiving sets are expected to be in operation by the end of 1953, compared with about 5000 sets now in use. . . Still hurting from your bout with income tax? The German American Trade News says that last year a married man with two children paid a 6.2 per cent income tax on a yearly salary of $3300 in the U. S. But, in the U. K. the same man, with the same income, paid 7.4 per cent; in France, 18.4 per cent and in Western Germany, 22.2 per cent.



Metallurgist John Redmond checks test results on a titanium carbide project in Kennametal Inc.'s research laboratory

How's work coming on that defense contract? Lt. Col. R. A. Jones pays a visit to John Redmond to talk over developments

Bringing Tomorrow Nearer—

A Metallurgist's Career

By ROBERT M. LOVE
Assistant Editor

"NERVE CENTER of his company's metallurgical development"—that phrase describes John Redmond of Kennametal Inc. As vice president, he controls and co-ordinates Kennametal's research and development in metals.

Testifying to Mr. Redmond's efficiency as a human control center are his firm's continuing achievements in production of cemented carbides. The Latrobe, Pa., company anticipates $30 million in total sales this year, an increase of about $2 million from 1952. Some 10,000 customers will pay about $22 million for Kennametal's tungsten carbide cutting tools this year.

Careful Schedule — The metallurgist plans his daily activities to guide operations within his department and to contribute to efficient interoffice functioning. Kennametal's engineers and production men work closely with the research staff, and Mr. Redmond is responsible for keeping them up to date.

Such a task calls for supervising a maximum of separate and often unrelated operations with a minimum of confusion—getting all the work done, but first things first. The tall, soft-spoken vice president achieves this by refusing to wait for reports to cross his desk. Instead, he checks on his numerous projects in person.

Work Begins—When this reporter called bright and early one recent morning, he found Mr. Redmond plunging into the day's work. First was an urgent telephone call from Washington—a request from an Air Force officer for a report on developments in jet engine parts. Mr. Redmond supervises development for defense activities as well as civilian production, the former accounting for about one-fourth of Kennametal's total production.

Among Mr. Redmond's varied projects is correlating research on raising inlet temperatures on jet engines, to increase power output. If temperatures within the engines could be raised from 1500 degrees to 2300 degrees, power might be tripled. The problem: Find materials best able to resist those temperatures.

Kentanium—Kennametal is now testing titanium carbide compositions, attempting to combine high temperature strength with thermal shock resistance. The answer may be Kentanium, whose essential ingredient is titanium carbide, with the auxiliary metal cobalt or nickel as conditions dictate.

After a concise telephone conversation, first of 25 or 30 during the day, Mr. Redmond turns to his mail. One letter contains an Air Force contract having to do with the production of turbine parts. Planning for the contract poses problems for Kennametal's production and research departments. After planning how to co-ordinate the work, Mr. Redmond telephones Floyd Gerard, process engineer in the adjoining manufacturing building, and outlines the project.

No Ivory Tower—"There are two philosophies of how to run a research department," the executive comments. "Some companies remove their development staff far from the turmoil of the production department. Others, like Kennametal, want research closer to production. Here we are in the thick of things, and we benefit from closer co-ordination with the rest of the company."

After starting work on the larger projects, Mr. Redmond begins a series of talks with his six-man staff. Chief Chemist Charles Hanna

Charles Hanna, chief chemist, discusses chemical analysis tests he conducts under John Redmond's direction

One of many short meetings is John Redmond's brisk and informal talk with staff member J. W. Graham

points out the necessity for a revision in an ore refining process. A hasty talk follows with Philip M. McKenna, president of Kennametal and chairman of the board.

New Applications — Supervising a multitude of projects requires close watch for unexpected new uses for company products. Research done for the Army often turns up interesting possibilities for civilian work. Kennametal scientists believe high temperature compositions developed for the Air Force may have widespread uses in hot working of metal.

"The skill with which a metallurgist operates depends largely on how well he keeps abreast of current events in metals," Mr. Redmond comments. His heavy schedule of committee work includes membership in the American Institute of Mining & Metallurgical Engineers, the American Chemical Society, American Ordnance Association and the Pittsburgh Society for Analytical Chemists.

Washington Committees — Once or twice a month he drives to Washington, sometimes for a meeting of a committee of the National Advisory Committee for Aeronautics, on which he serves. The Army conducts studies of armor-piercing materials, another of his interests as Kennametal produces antitank projectiles.

A quick lunch interrupts Mr. Redmond's work, but he takes advantage of the break to discuss planned projects with members of the production and engineering departments.

Back to Work—Two engineers intercept John Redmond as he returns from lunch. They report on progress of a test with a turbine impeller. Quickly the metallurgist goes over test results with them. Only then can he remove coat and hat and return to an orderly pile of papers on his desk.

Keeping in touch with the company's operations, Mr. Redmond first reads a report from Kennametal's tungsten mine in Nevada and from columbite mines in British Guiana.

The "Link" — A telephone call breaks in on the reading. Mr. Redmond, as link between production, engineering and research departments, is asked to order materials for use in a research project.

Afternoon visitors arrive soon. Although several would be satisfied to talk with secondary officials, John Redmond refuses to shunt his responsibilities. "As long as I co-ordinate the work, I should take the responsibility of discussing it with interested persons," he says. One of the visitors today is an Air Force colonel, on confidential business. Another is a tool engineer for an automobile company, asking about quality control.

Company Objectives—Constantly changing company policy calls for frequent talks on research projects. Once a day Mr. Redmond's staff meets with production and engineering men to iron out common problems and to correlate their objectives.

At today's meeting the staff considers methods of building a machine to test experimental small parts. To sell carbide inserts in a tool, Kennametal frequently goes far beyond the carbide or even the tool design, showing potential buyers how the company's products will react to conditions of operation. "Sometimes we see a need for a machine that doesn't exist," Mr. Redmond remarks. "We then take it upon ourselves to get the equipment d e s i g n e d, built and tested."

Day's End—When the conference closes, Mr. Redmond's working day will be far from complete. Dropping some papers into his brief case, he plans to work at home until late at night. "I don't mind late hours when I realize what metallurgical progress means to Americans," he says. "If a project looks too big for us to attempt, we remember that industry's accomplishments today seemed impossible yesterday. Yes, metallurgists have a job on their hands."

●

This is the sixth in a series on what various types of executives do on a typical day. For others, see STEEL, April 14, 1952, p. 74, on a purchasing agent; June 9, 1952, p. 72, on a sales vice president; Aug. 18, 1952, p. 75 on a company president; Nov. 10, 1952, p. 79 on an inventor-engineer, and Feb. 9, 1953, p. 70 on a market research manager.

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High Strength with Excellent Cold·Forming Properties

N-A-X HIGH-TENSILE, having 50% greater strength than mild carbon steel, permits the use of thinner sections —resulting in lighter weight of products. It is a low-alloy steel—possessing much greater resistance to corrosion than mild carbon steel, with either painted or unpainted surfaces. Combined with this characteristic, it has high fatigue and toughness values at normal and sub-zero temperatures and the abrasion resistance of a medium high carbon steel—resulting in longer life of products.

N-A-X HIGH-TENSILE, with its higher physical properties, can be readily formed into the most difficult stamped shapes, and its response to welding, by any method, is excellent. Due to its inherently fine grain and higher hardness, it can be ground and polished to a high degree of lustre at lower cost than can mild carbon steel.

Your product can be made lighter in weight . . . to last longer . . . and in some cases be manufactured more economically, when made of N-A-X HIGH-TENSILE steel.

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N-A-X Alloy Division — Ecorse, Detroit 29, Mich.
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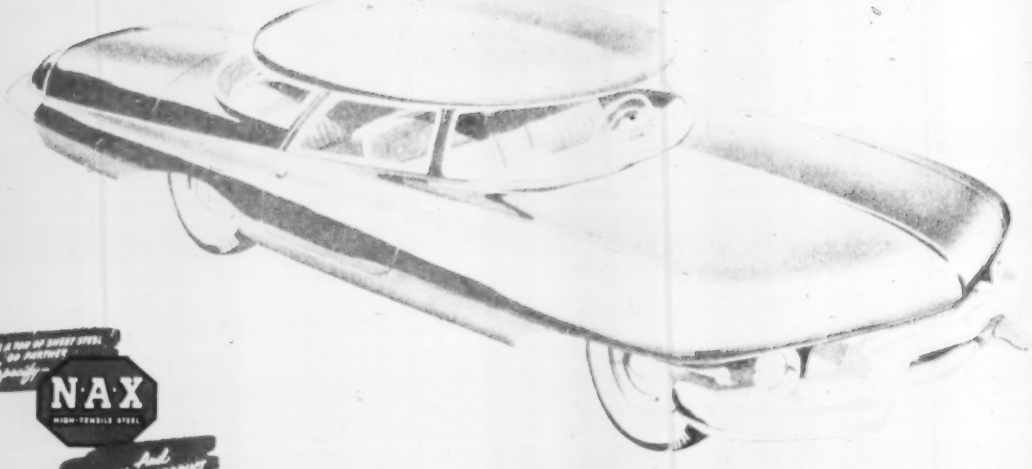

MAKES A TON OF SHEET STEEL GO FURTHER
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KEEP YOUR SCRAP MOVING TO YOUR DEALER

By FLOYD G. LAWRENCE *Detroit Editor*

Mirrors of Motordom

Worker carelessness is increasing automakers' headaches. While most cars are o.k. on quality, the occasional lemon is squeezing in

ONCE UPON A TIME, an irate motorist concluded that the new car he had purchased was a lemon. He proceeded to decorate the offending vehicle with signs and drawings which made his opinion clear.

Then a court, so the story goes, stepped in and reduced his campaign to a whisper by ruling that you cannot label your car a lemon even though it is your car and it is a lemon. In the eyes of the law, it appears, there is no lemon-aid.

Worried—That story may be fact or fancy, but the fact remains that automakers are worried about their products' quality. Despite all their painstaking testing and ingenious engineering, an occasional lemon is being squeezed today into the family garage. Tales like the following show why:

One of several automakers produces two models with the same basic body. The difference is brought about by the use of distinctively different trim on the two cars. Not long ago a vehicle went down the line and emerged to start a torrid controversy. Approached from the right side the car was a Goldilocks Deluxe, while from the left it was a crewcut standard.

More serious was an occurrence in an engine assembly line. Pistons in this assembly line are matched to the block, then numbered and put on an overhead conveyor to receive rings before meeting the block again further down the line for final assembly. On this black day a worker missed one set of pistons completely and the next thirty engines coming down the line had the pistons of the block ahead.

The error was caught, of course, but thirty engines had to be pulled off the line and run through again. The cost to the auto companies of this sort of error runs into millions of dollars annually, not to mention the good will lost when an owner gets a car with one of the grosser errors which has somehow escaped detection.

Despite Precautions — It's somehow a little sickening when engineering departments will take a little gadget like a door latch and put it on a test stand where it is relentlessly slammed and opened thousands of times. When the design and materials have proven themselves to the engineer's satisfaction, the latch is produced for the cars. Then some worker on the line forgets to tighten a screw or pinch a clamp and the door flies open. Maybe nobody is injured, but to the owner and his friends the Blooper V-8 has unsafe door latches.

The problem is not new to the automakers. Obvious answers have been evolved in such techniques as automation, automatic or multiple gaging, breaking the assembly down into extremely simple repetitive tasks, etc. But in the last analysis, the worker still has a role to play in building your pride and joy. It is that role which leads to knobs coming off in your hand, turn signals that don't cancel, rattles under the dashboard, windows that leak and a thousand more serious maladies that creep in to make an occasional auto owner wonder if his car was ever engineered at all.

Labor Shortage—Today the labor shortage in Detroit is acute. Automakers estimate they could use another 20,000 persons right now and increasingly older, handicapped and women employees are being drawn in. Wage rates in Detroit are no longer high enough relative to rates elsewhere to tempt workers to the motor city.

A natural result of that sort of situation is a tendency to set up jobs so that the worker who previously tightened five bolts on the assembly now tightens six. He or she has a 20 per cent greater chance of lousing up the dinkus assembly in your new whatsit. With the influx of newer workers, more inspectors are needed on the line and the amount of line repair is stepped up. Here again, occasionally something can go wrong.

Attitude—But the most telling result of the labor shortage is worker indifference in many cases. If the automaker should be fortunate enough actually to fire a worker without losing a week's production in wildcat strikes as a result, the worker knows that he can go right across the street and get another job. And as you may have discovered in your own plant, that leads many to indifference that will show up in the final product despite all that can be done.

In most cases the dealer stands behind the car he sells. If things are wrong with your new car list them for correction before the guarantee period runs out. And

Light on Crankshaft Strain

Tiny spinning mirrors, actually 240 chrome-plated gear teeth on a special fan belt pulley, help Ford Motor Co.'s engineers produce tougher crankshafts. Crankshaft twist sets up a vibration pattern which can be measured from the reflected light beams

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Auto, Truck Output

U. S. and Canada

	1953	1952
January	612,815	424,559
February	623,793	464,557
March	746,933	525,024
April		570,464
May		542,559
June		542,478
July		226,134
August		322,755
September		595,715
October		656,767
November		548,782
December		569,715
Total		5,989,509

Week Ended	1953	1952
Mar. 7	158,825	115,126
Mar. 14	165,762	120,392
Mar. 21	169,923	125,347
Mar. 28	181,749	132,850
Apr. 4	181,855	125,668
Apr. 11	179,000*	123,180

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary

remember as your windshield wiper sails by in the slipstream that such occurrences are signs of the times.

The automakers are having their troubles, too.

Car of the Week

Commenting on the new Dodge V-8, one newsman was moved to ask, "Who put the Benzedrine in Grandma Dodge's Ovaltine?" A week spent driving a Dodge Coronet makes it quite clear the stuff is there.

In the minds of many, Dodge has been the car of the school teacher and the minister — dependable, middle-classish and not spectacular in performance. Now comes the Red Ram engine with a thrust that would toss any school marm's textbook into the back seat and give many on the road their first look at the rear end of a Dodge. One may well ask what has happend.

The answer in brief is that Dodge is hoping to expand its market. Dependability and unpretentious comfort still keynote the Dodge, but the Red Ram is aiming for the young bucks.

Production of these 140-hp vitamin pills for the Dodge emblem has now reached 1200 daily after a unique beginning (see STEEL, Nov. 24, 1952, p.83, for details) and the ultimate capacity will be 2400 per day when additional machine tools are delivered later this year.

The new Dodge, to put it bluntly, is not much like a Dodge. Getaway is noteworthy and available torque on the road for passing leads to confidence. At cruising speeds of 60-70 the car is steady and steering control is sufficiently sensitive. Cornering appears to be better than average and the over-all feeling of reserve power and control is very satisfying.

The tinted glass available at additional cost contributes to greatly reduced eye fatigue during a 175-mile trip at night, incidentally, and appears to be a worthwhile addition.

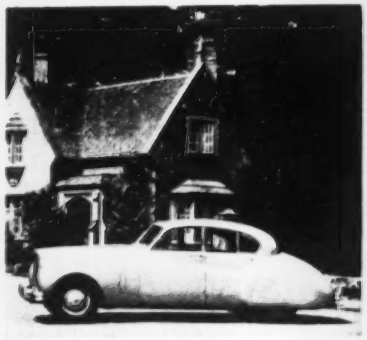
Dodge has termed its new line the "action" car. Now it is waiting to see if school teachers like "action" and whether those traditionally action-minded will accept the car. One thing seems sure — the "action" car has not been misnamed.

We Prefer Deluxe, Says Pontiac

Pontiac reports that Americans prefer deluxe motor cars. Sales of the luxurious hardtop Catalina coupe have risen from 8 per cent of the division's sales in 1950 when the model was introduced to 19.1 per cent in 1952. A further increase in production of the model is expected. Further evidence of the public's taste is revealed in the fact that in December, the introductory month for Pontiac, 12 deluxe models were built for every special model. By February the ratio was 15-1 and projected schedules for the next few months will hold to the higher figure, says H. E. Crawford, general sales manager.

Mercury Offers Power Braking

Mercury models now have a power braking system as optional equipment. Direct mechanical linkage with the master cylinder has been preserved and a vacuum reservoir supplements the engine intake manifold as the source of vacuum braking power. A 33 per cent reduction in brake pedal pressure is claimed while the pedal is placed almost level with the accelerator making for quicker



Mark This Jaguar

Jaguar cars Ltd., which recently put Borg-Warner automatic transmissions in its Mark VII sedan (above), will soon produce a convertible to capture more dollars in the American market. Jaguar, England's biggest dollar earner, has doubled U.S. sales each year since 1948 when the line was first introduced here. The convertible will use the Jaguar XK-120 chassis

movement from one to the other. Also new at L-M is a zipper being used on convertibles that automatically seals itself against air and water. Previously developed and used only on military equipment, the omniscient gimmick is being used to seal out moisture around detachable plastic rear windows on 1953 Lincoln and Mercury convertibles. A pair of rubber lips fold over the metal teeth to seal the fastener and "to prevent unsightly wicking of moisture through the fabric top." Overlapping flaps around windows needed to protect conventional zippers are eliminated.

Ternstedt Gets Buick Plant

The Buick Coldwater Road plant now under construction has been assigned to the Ternstedt Division. Originally planned as a subassembly plant for jet engine parts, the plant now will be used for automotive hardware and defense products.

Chevrolet To Build Labs

Chevrolet Division of G.M. will build a new engineering center including an administration building, experimental shop and laboratory at the General Motors Technical Center near Detroit. Cost is estimated at $20 million, of which new equipment will account for about one-half.

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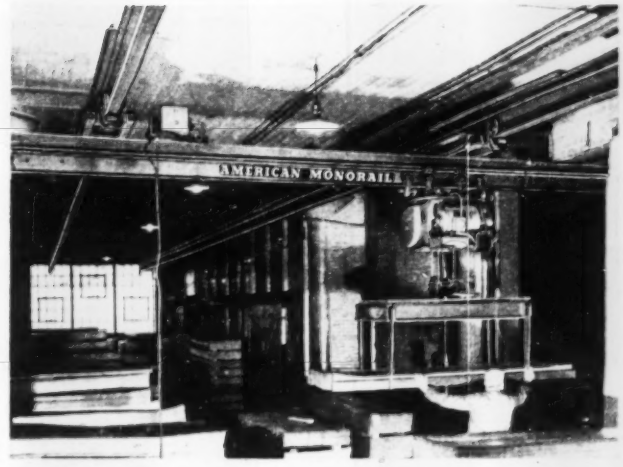

See our booth at the
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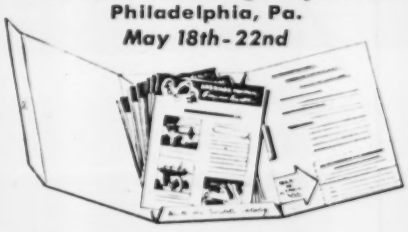

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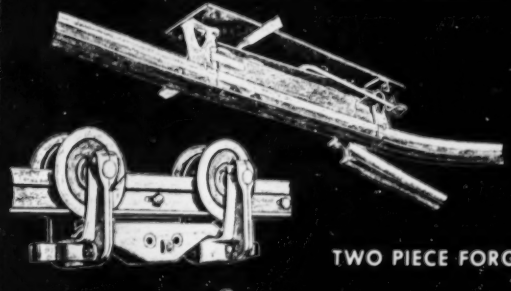
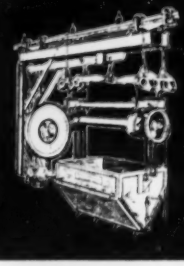
RUGGED SWITCH CONSTRUCTION

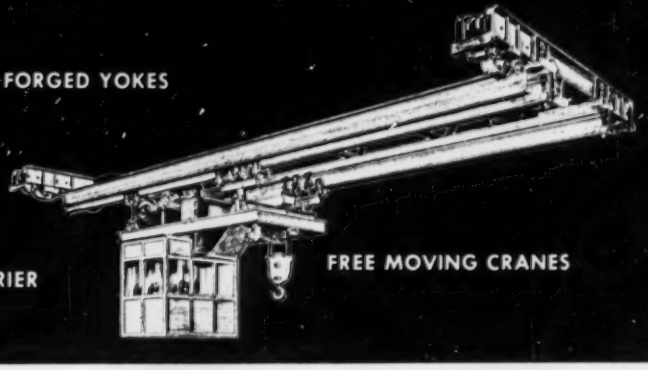


OVERLAPPING SPLICE

TWO PIECE FORGED YOKES

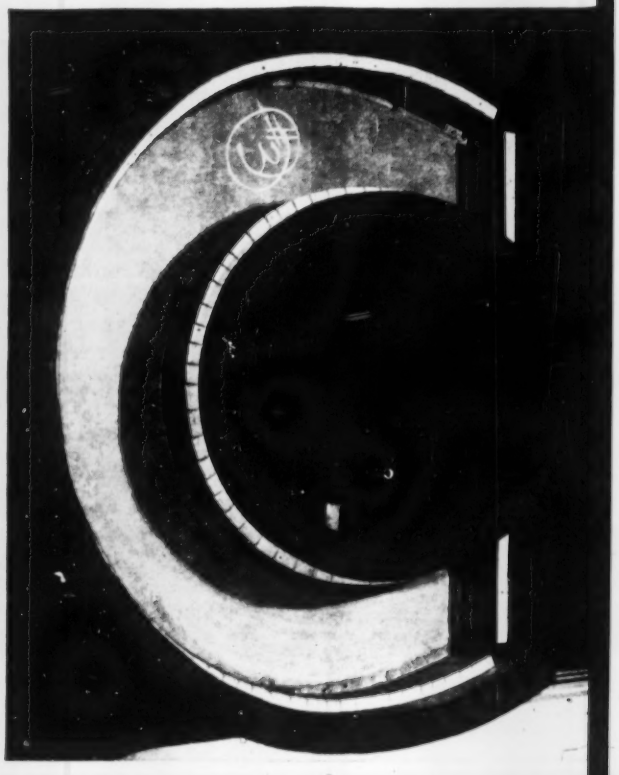


SCALE HOIST CARRIER



FREE MOVING CRANES

SHARON Galvanite*



Leading Sign Builder Chooses Galvanite*

● Builders of signs for outside display consider atmospheric conditions their greatest single enemy. The snow, sleet and wind conditions in the north and east, the tremendous heat in the south and southwest, the salt air of the oceanic areas and the destructive fumes of industrial concentration all must be considered when designing and building a display for national consumption.

That's why a great many sign builders have turned to Galvanite* — the weather-fighting, zinc coated steel developed by Sharon to add life to steel where it is subjected to the constant ravages of the atmosphere. Galvanite* is used to a great extent in the automotive, appliance and building industries because it is easy to use, it holds its coating under severe forming conditions and provides an excellent surface for enameling, painting or further finishing.

If you are looking for a good, serviceable, weather-resistant steel be sure you have all the facts on Sharon's great Galvanite*. Contact the Sharon office nearest you, or write direct for fully explanatory Galvanite* booklet.

*TM

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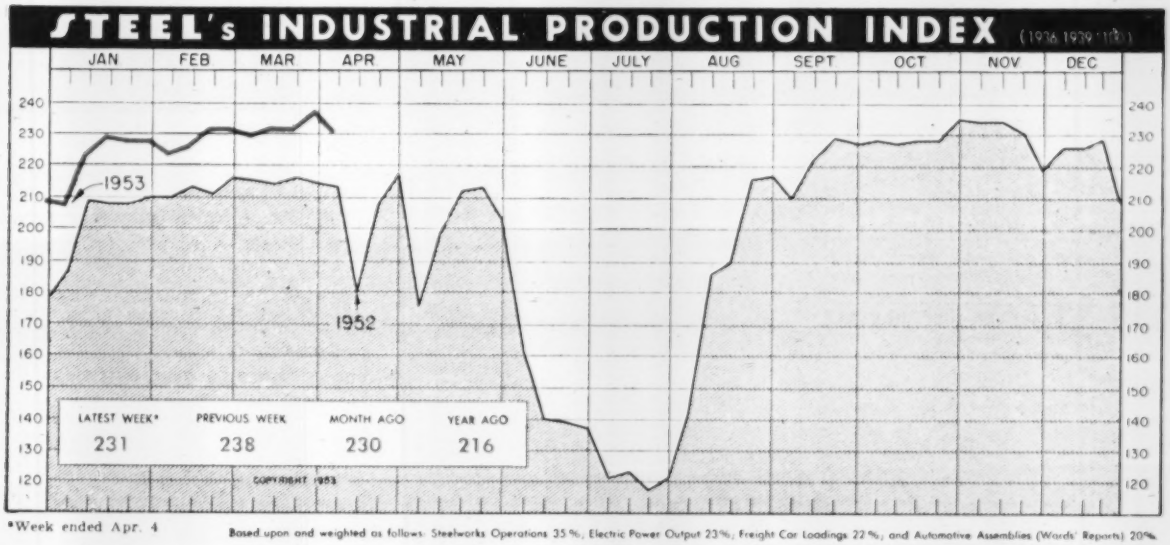
Cleveland	Dayton
Detroit	Indianapolis
Milwaukee	New York
Philadelphia	Rochester
Los Angeles	San Francisco
Montreal, Que.	Toronto, Ont.

Where Rust Is A Problem-First Consider SHARONSTEEL Galvanite*

SHARON STEEL CORPORATION *Sharon, Pennsylvania*



*Week ended Apr. 4

Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automotive Assemblies (Wards' Reports) 20%.

Businessmen are preparing for an era of stiff competition by spending heavily on new distribution facilities. Production index declines as steel output falls off

TIP-OFFS of future business conditions are often found in the momentum of new construction. Dollars spent on private and public facilities are good indicators of what is expected business-wise by industry, government and the public.

Outlays on new construction in the first quarter set a new record for the season by climbing to $7 billion, or 6 per cent over expenditures in the same months in 1952, estimates the Commerce department's Building Materials Division.

Rises, Lags — Diverse trends, however, are showing a tendency to shape up among the different construction categories. Expenditures on public construction in the first three months of 1953 rose only 1 per cent over the year to $2 billion, despite increases in military and public utility expenditures. Private expenditures, on the other hand, jumped 7 per cent over a year earlier to over $4.9 billion. Considering the 2 to 3 per cent rise in the cost of construction, new public facilities probably declined in number of units while the private unit-total gained substantially less than 7 per cent.

The direction of business outlays is leaning increasingly toward the distribution level, rather than production. Private industrial outlays for new construction in the first quarter dropped 5 per cent over the year to $588 million. Meanwhile, expenditures jumped 39 per cent to $150 million on warehouses, office and loft buildings. Construction spending rose 49 per cent to $185 million on stores, restaurants and garages.

These figures indicate that businessmen are becoming increasingly conscious of John Q. Public. Stores and service establishments are moving to newly developed areas and more warehouse space is being added to house the many consumer goods coming off assembly lines. The tip-off in new construction may well be that competition and selling will have star-billing in the coming industrial drama.

Temporary Drop — After setting a new postwar record in the previous week, industrial activity took a temporary decline in the week ended Apr. 4. STEEL's production index for the week fell 7 points to 231 of the 1936-1939 average. Most of the decline was caused by the turnoff of many steel operations in Pittsburgh, which, in turn, lowered freight car loadings. Automotive operations inched up slightly, as did electricity production.

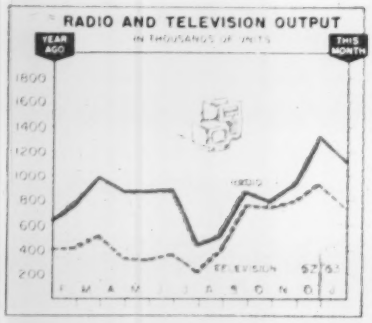
Steel Production Drops . . .

Steel production is making a quick return to high levels after a setback in the Pittsburgh area from the shutdown of an open-hearth shop at U. S. Steel Corp.'s Homestead Works for repairs and a strike on a railroad serving U. S. Steel plants. National output of steel in the week ended Apr. 4 dropped 134,000 net tons to 2,190,000 tons, according to the American Iron & Steel Institute. In the week ended Apr. 11, production regained an estimated 26,000 tons as furnaces started producing again when the strike ended. The open-hearth shop remains closed.

Truck Output Nears Record . . .

The truck industry, spurred by insistent demand, may raise its monthly output in April to within 2 per cent of the all-time high. Both light and heavy trucks are rumbling off U. S. production lines at a near-record momentum as steel becomes more available. If assemblies continue without a hitch, completions this month may total around 137,000 trucks, about 3000 vehicles under the monthly peak established in May, 1951, says *Ward's Automotive Reports*.

Production in the first quarter of

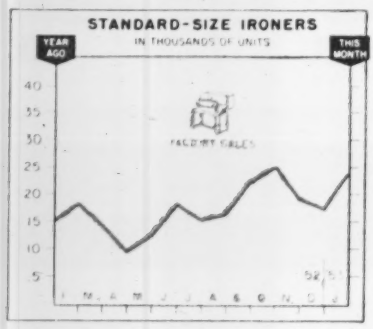


Radio and Television Output

Thousands of Units

	Radio		Television	
	1953	1952	1953	1952
Jan.	1,093	632	719	405
Feb.	1,192	759	730	409
Mar.		976		511
Apr.		848		323
May		748		309
June		874		361
July		442		199
Aug.		544		398
Sept.		866		756
Oct.		772		724
Nov.		924		780
Dec.		1,325		921
Total		9,711		6,966

Radio-Television Mfrs. Assn.

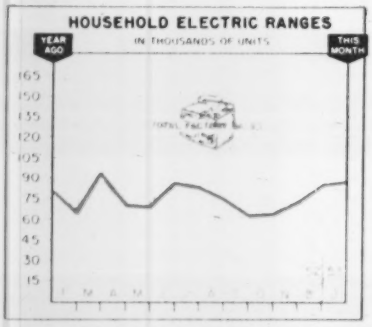


Standard Size Ironers

Factory Sales—Units

	1953	1952	1951
Jan.	24,395	15,636	24,600
Feb.	22,586	17,630	32,400
Mar.		13,913	34,700
Apr.		8,938	23,700
May		12,652	24,200
June		17,654	24,500
July		15,025	11,100
Aug.		16,477	17,200
Sept.		22,492	18,300
Oct.		25,204	29,800
Nov.		19,724	20,500
Dec.		16,798	16,900
Total		202,143	277,700

American Home Laundry Mfrs. Assn.

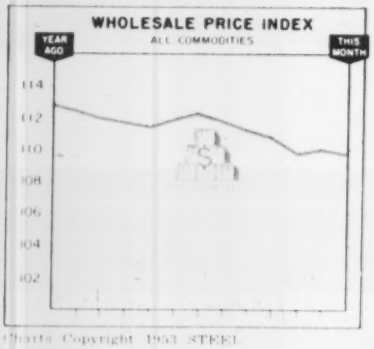


Household Electric Ranges

Total Factory Sales—Units

	1953	1952	1951
Jan.	88,145	79,982	130,316
Feb.		63,063	121,585
Mar.		93,225	159,865
Apr.		69,149	118,823
May		88,117	106,685
June		86,847	106,589
July		83,465	60,530
Aug.		74,853	64,042
Sept.		62,404	93,551
Oct.		63,143	109,043
Nov.		72,982	101,476
Dec.		84,630	72,140
Total		901,860	1,244,645

National Electrical Mfrs. Assn.



Wholesale Price Index

(1947-1949=100)

	1953	1952	1951
Jan.	109.9	113.0	115.0
Feb.	109.6	112.6	116.5
Mar.		112.3	116.5
Apr.		111.8	116.3
May		111.6	115.9
June		111.3	115.1
July		111.8	114.2
Aug.		112.2	113.7
Sept.		111.7	113.4
Oct.		111.1	113.7
Nov.		110.7	113.6
Dec.		109.6	113.5

U. S. Bureau of Labor Statistics

Charts Copyright 1953 STEEL

Issue Dates on other FACTS and FIGURES Published by STEEL

Construction	Apr. 6	Gear Sales	Mar. 9	Refrigerators	Feb. 2
Durable Goods	Mar. 30	Gray Iron Castings	Mar. 16	Steel Castings	Mar. 16
Employ., Metalwk.	Mar. 30	Indus. Production	Feb. 16	Steel Forgings	Mar. 16
Employ., Steel	Apr. 6	Machine Tools	Mar. 23	Steel Shipments	Nov. 3
Fab. Struc. Steel	Mar. 30	Malleable Castings	Mar. 16	Vacuum Cleaners	Mar. 23
Foundry Equip.	Mar. 23	Pumps	Apr. 6	Wages, Metalwk.	Mar. 9
Freight Cars	Mar. 23	Prices, Consumer	Jan. 26	Washers	Mar. 30
Furnaces, Indus.	Apr. 6	Range, Gas	Mar. 30	Water Heaters	Mar. 30

1953 ran to 342,624 light and heavy vehicles, the third highest opening quarter in history and 8 per cent over the January-March turnout in 1952. Industry shipments in the first quarter continued to lean toward the light models; lights garnered 67.1 per cent of the total, compared with 62.1 per cent in the first quarter of both 1952 and 1951.

Passenger cars are also coming off assembly lines at a rapid pace. U. S. assemblies in the week ended Apr. 4 totaled a robust 140,134 cars, more than 50 per cent over production in the comparable week of 1952. This is slightly above the previous week's 139,276 units and marks the strongest output since March, 1951.

Combined U. S. and Canadian production in the week ended Apr. 4 totaled 181,855 passenger cars and trucks, up only 106 units from the previous week but well over the 125,668 units produced in the week ended May 5, 1952.

Consumer Credit Soaring . . .

A big question arising in the metalworking picture: "Can the public afford to spend much more on new durables?" Fact is, installment credit in the past year has risen at an alarming rate. Several important leading organizations are tightening terms, and many economists see a continued trend toward a tight money market. The Federal Reserve Board says that installment credit in the year ended Mar. 1 rose 26 per cent to $16.7 billion. Installment sale credit rose 30 per cent to $9.5 billion, and automotive sale credit alone jumped 38 per cent to $5.5 billion.

New Firms Increase . . .

More new companies opened their doors for the first time in January and February than in any like two months in the last four years. New incorporations receiving charters in the first two months of 1953 totaled 17,415 firms, up 12.4 per cent from last year and more than in any comparable period since 1948, says Dun & Bradstreet Inc. New incorporations in February numbered 7947 enterprises, an increase of 11.3 per cent over a year earlier, while charters in January went to

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	95.0	101.0	103.0
Electric Power Distributed (million kwhr)	8,080[1]	8,075	7,219
Bituminous Coal Output (daily av.—1000 tons)	1,366	1,353	1,638
Petroleum Production (daily av.—1000 bbl)	6,475[1]	6,482	6,402
Construction Volume (ENR—millions)	$342.0	$344.1	$345.7
Automobile, Truck Output (Ward's—units)	181,855	181,749	125,668
TRADE			
Freight Car Loadings (unit—1000 cars)	705[1]	715	706
Business Failures (Dun & Bradstreet, number)	171	188	185
Currency in Circulation (millions)[3]	$29,754	$29,600	$28,445
Dept. Store Sales (changes from year ago)[3]	+11%	+16%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,188	$18,575	$17,542
Federal Gross Debt (billions)	$264.5	$264.7	$257.5
Bond Volume, NYSE (millions)	$14.3	$16.2	$13.6
Stocks Sales, NYSE (thousands of shares)	9,826	9,677	7,553
Loans and Investments (billions)[4]	$77.8	$78.0	$73.7
United States Gov't. Obligations Held (billions)[4]	$30.6	$31.0	$32.0
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	181.31	181.31	171.92
STEEL's Nonferrous Metal Price Index[6]	230.5	225.1	243.6
All Commodities[7]	109.8	110.0	112.5
Metals and Metal Products[7]	113.3	113.4	114.2

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1953, 2,254,459; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

9468 companies, or 13 per cent more than in January, 1952.

Railroad Incomes Rise . . .

Railroads are finding that lowered operating expenses this year are more than offsetting their drop in revenue. The Association of American Railroads estimates that the net income of Class 1 railroads in January and February rose 20 per cent over a year earlier to $114 million. Total operating revenues in the first two months of 1952 amounted to $1.7 billion, a decrease of 2.1 per cent, while expenses amounted to $1.3 billion, or 3.9 per cent under the same two months, last year.

Furnace Orders Climb . . .

Builders of industrial furnaces obtained in February slightly more new orders than in January and considerably more than in February of last year. New orders in February for fuel-fired furnaces (other than for hot-rolled steel) totaled $3.9 million in value, compared with $3.5 million in January and $2.4 million in orders placed in February, 1952. Orders for electric resistance furnaces totaled in February $1.7 million, only $27,000 over January but well over the $1.4 million valuation of orders received in the same 1952 month.

Radio, TV Output Up . . .

Rising production of television receivers is continuing to brighten the electronics picture. Radio-Television Manufacturers Association says that U. S. plants in February produced 730,597 TV sets, compared with 409,337 units in the same month of 1952. Radio production also moved at a fast pace in February, with assemblies totaling 1,192,439 units. In February, 1952, industry output amounted to only 759,453 radio receivers.

Trends Fore and Aft . . .

Manufacturers of durable goods in February chalked up a $12.2 billion sales volume, or 14 per cent above February, 1952. Inventories rose 5 per cent in the year ended Mar. 1 to $24.5 billion . . .Wholesalers' sales in February rose 2 per cent over the same month in 1952. . . Electricity production in the week ended Mar. 28 rose 11.1 per cent over the comparable week, a year earlier. . . The profit picture for March is better than at any time in the past six months, reports a survey of the Purchasing Agents Association of Chicago. . . General Electric is cutting $13 to $15 off the price of its electric blankets.

"We're former Sheet Coil users. After testing Thinsteel, the precision cold rolled strip steel, it was evident that many dollars could be saved. First, we get more finished parts per ton because of Thinsteel's exceptionally close tolerance — providing maximum feet per pound. Next, we are getting much longer die life — that means less 'downtime,' too — because Thinsteel's uniformity of physicals and accuracy to all specifications smoothed our fabricating problem. And the finish keeps us out of 'hot water' in our plating department — gives us the best looking job in our business and that means more profitable business for us. Maybe you had better switch to Thinsteel."

"We switched to Sheet Coil and are making more money. I know it's wide sheet 'production run' material slit to size, but it's just right for our needs. We don't use expensive, intricate dies — our simple blanking operation can take thickness variations in stride, there's no need for close tolerance material. Since our finished product is painted we find the surface finish of Sheet Coil completely satisfactory for this operation — in fact, the surface not being as smooth is good for our painting requirement. So you see, we are getting a best buy for our need with Sheet Coil."

No need for argument as to which strip is better for your job. Kenilworth stocks both—and is ready to help you determine your best buy. Make Kenilworth's big inventory your warehouse—you can depend on Kenilworth's service when you need it.

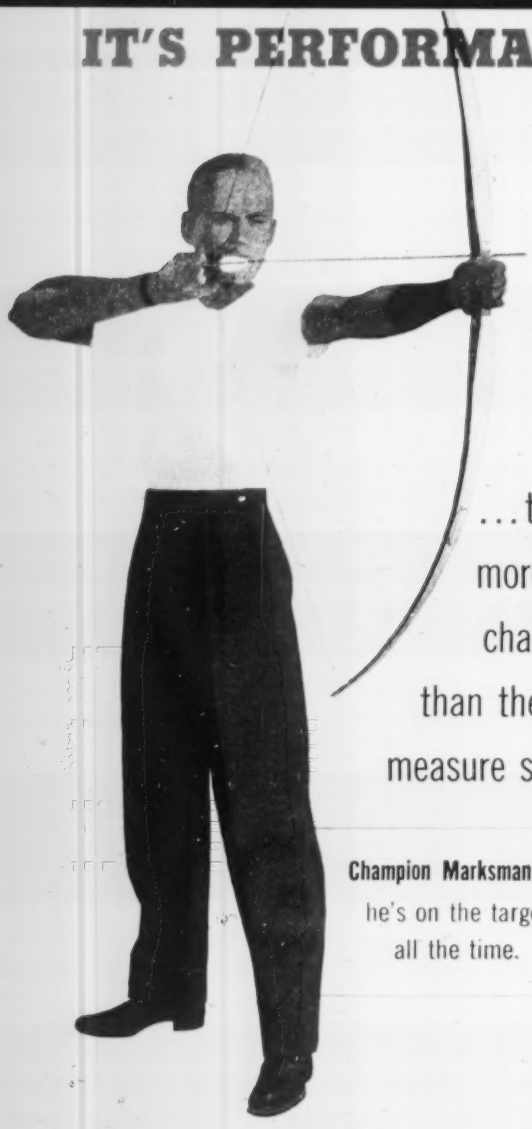
THE Kenilworth Steel co.

750 BOULEVARD,
KENILWORTH, NEW JERSEY

SPECIALISTS IN FLAT ROLLED METAL PRODUCTS

Telephones: N. Y. COrtlandt 7-2427
N. J. UNionville 2-6900
Teletype: Roselle, N. J., 387

IT'S PERFORMANCE THAT COUNTS



...there's more to a champion than the tape measure shows!

Champion Marksman... he's on the target all the time.

Average Marksman... he may measure the same, but he misses when conditions are tough.

HARDTEM DIE BLOCKS

perform like "champions" in your production line!

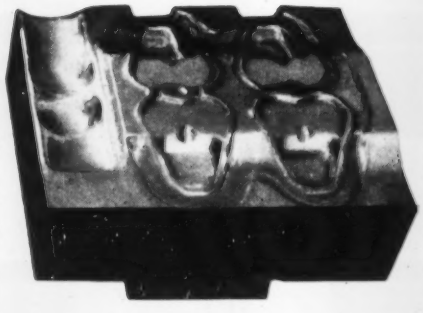
Heppenstall Hardtem Die Blocks perform like "champions" because they possess those extras that result in superior quality. Their patented steel analysis resists softening and heat checking in service. Records from plants using Hardtem Die Blocks prove the following benefits for production:

★ **Long life of dies** ★ **Holding of true dimensions**

★ **Less down time** ★ **Longer production runs**

★ **Lower overall die cost**

It will pay you to try Hardtem Die Blocks. Call Heppenstall Company, Pittsburgh 1, Pa. Sales Offices in principal cities.



Heppenstall

The most dependable name in die blocks

Men of Industry

G. M. STICKELL
. . . Landis Machine gen. mgr.

G. M. Stickell, vice president, **Landis Machine Co.,** Waynesboro, Pa., assumes added duties of general manager. **J. H. Elliott,** who formerly served as president and general manager, will continue as president.

Albert T. Both, general superintendent of Cleveland operations for **Chase Brass & Copper Co. Inc.,** subsidiary, Kennecott Copper Corp., was appointed works manager at Cleveland. **Charles W. Yarrington** was made general superintendent, Cleveland mills.

Scullin Steel Co., St. Louis, elected **James E. Nolan** vice president and assistant to the president, and appointed **Milton O. Kassing** purchasing agent.

Stanley T. Johnson was made purchasing agent, nonferrous metals, **United States Steel Corp.,** Pittsburgh, succeeding the late **Anthony Siragusa.**

Jim Davidson, recently named director of sales and service, **Clinton Machine Co.'s** engine division, Maquoketa, Iowa, has received another promotion as general manager, Clinton Chain Saw Division, Clinton, Mich. **Clete Erlacher,** sales manager, Clinton Engine Division, now heads the entire sales and service there.

PAUL W. KNOX
. . . a purchasing agent at Eaton Mfg.

Paul W. Knox was added to the central purchasing staff at **Eaton Mfg. Co.'s** general offices in Cleveland, responsible for procurement of the company's steel requirements. Mr. Knox has served U. S. Steel Corp. in various capacities for 17 years, most recently as Cleveland district service manager.

F. B. Pinzel was appointed assistant general sales manager, **Buffalo Steel Division,** H. K. Porter Co. Inc. He has been engaged in sales with Republic Steel Corp. for more than eight years.

Donald E. Hawkinson, for 26 years with **Greenlee Bros. & Co.,** Rockford, Ill., was appointed sales manager of its special machine tool department. **E. C. Van Tiem** was made manager, Detroit office, to succeed the late **John M. Macrae.**

Eugene A. Pelizzoni was made works manager, **Atkins Saw Division,** Indianapolis, Borg-Warner Corp. He formerly was assistant works manager, Mack Mfg. Corp.

Mid-States Welder Mfg. Co., Chicago, elected **William W. Jetter** president and **J. William Jetter** vice president and general sales manager.

J. C. Scott is new product sales manager of **Fruehauf Trailer Co.,** Detroit.

W. H. ROWAND
. . . a v. p. at Babcock & Wilcox

At **Babcock & Wilcox Co.,** New York, **W. H. Rowand,** boiler division, was elected a vice president, continuing as divisional chief engineer. **M. Nielsen,** recently elected a vice president, was placed in charge of that division's manufacturing department. In the refractories division, **J. E. Brinckerhoff** was named general manager, **C. L. Norton Jr.** executive assistant in charge of development and engineering, **Carl Claus** executive assistant in charge of sales and manufacturing. **J. D. McCullough** continues as chief engineer with additional duties, and **Mark J. Terman** becomes sales manager. **C. H. Gay,** vice president and former head, manufacturing department, boiler division, was placed in charge of the newly established atomic power division.

A. M. Byers Co., Pittsburgh, appointed **Buckley M. Byers** general manager, wrought iron sales. He succeeds the late **R. H. Gardner.**

John J. Egan Jr. was appointed manager of sales, partitions and conveyor divisions, **Virginia Metal Products Corp.** His headquarters will be in Orange, Va.

Inland Steel Co., Chicago, appointed **Samuel G. Wagner** assistant to the manager, sheet and strip division, sales department. **Richard D.**

Browne succeeds as assistant manager, order division.

A. W. Jacobson was made manufacturing manager, pilotless aircraft at **Boeing Airplane Co.**, Seattle. **W. E. Ramsden** fills the position of experimental department manager.

Max Noble rejoins **Cory Corp.**, Chicago, in an executive sales promotion capacity. He has been with National Production Authority.

General Fireproofing Co., Youngstown, elected **E. A. Purnell** first vice president, **Alfred J. Ball** vice president-furniture sales, and **D. W. McClure** vice president-contract sales.

Copper Range Co., Boston, elected **J. V. O'Connor Jr.** a vice president. He has been located in Pittsburgh, associated with the C. G. Hussey & Co. division since 1935.

Ekco Products Co. appointed **Norman J. Gaynor Jr.** manager of its Canton, O., plant. He formerly was general superintendent of Lalance & Grosjean, Woodhaven, L. I.

A. O. Smith Corp., Milwaukee, appointed **George M. Graetz** manager of its new eastern plant, welding products division, now under construction at Lancaster, Pa., and scheduled for completion by early summer. Mr. Graetz was project manager in the development of the new plant for welding electrodes. This past year he assisted J. J. Bohmrich, group executive.

JOHN D. WRIGHT
. . . new president of Thompson Products

FREDERICK C. CRAWFORD
. . . chairman, Thompson Products

At **Thompson Products Inc.**, Cleveland, **John D. Wright** becomes president succeeding **Frederick C. Crawford**, who moves up to chairman of the board. Mr. Wright was vice president and general manager, and continues in the latter position.

Gilmore Roberts succeeds **Edwin J. Donewirth**, retired, as manager, stamping plant, **American Radiator & Standard Sanitary Corp.**, Buffalo.

T. H. Herbst was appointed factory manager, **United Tube Corp. of Ohio**, Cleveland. Before joining United Tube he was associated with Linde Air Products Co. for 17 years, most recently in charge of inert gas welding development.

Arthur M. Simpson was made manager, revolving door division, **International Steel Co.**, Evansville, Ind. **Ray Goad** will be sales manager. Mr. Simpson formerly was vice president of Kawneer Co.

Philip D. Pearson was appointed manager, **Caland Ore Co.**, Inland Steel Co.'s Canadian subsidiary. **E. W. Whitman** was named chief engineer at Caland's Steep Rock, Ont., operations.

Tom R. Smith, director of research and development for **Maytag Co.**, Newton, Iowa, since 1938, was

GEORGE M. GRAETZ
plant mgr. for A. O. Smith Corp.

T. H. HERBST
. . . United Tube factory mgr.

TOM R. SMITH
Maytag v. p.-research, development

"A Triple play BY RB&W REALLY SAVED US PLENTY!"

"It took us by surprise," Al went on, "when an RB&W man told us* he could speed up assembly of this precision screw-and-clamp unit and save us money besides. We figured we'd been doing O.K. the old way."

"What was the old way?" asked Mac, who'd recently started in at the shop.

"Well, it was a one-two-three operation. We used to machine the slotted-head screw for the clamp on that machine over there. Then we'd make a special collar, and fit it around the screw head to prevent the screw-driver from slipping out of the slot while the clamp was being applied or adjusted.

"What RB&W did was to cold-form the whole thing—screw, slot and collar—all in one piece. Wasn't an easy job, either—they had to strike a slot in the screw head and form the collar at the same time. Now we're saving one-third on our previous assembly costs—along with the price of the special collar."

Which proves that you can generally cut costs, if you look hard enough . . . even in such simple things as fasteners. It also underlines the creative approach to fastening problems you can expect from RB&W, as well as practical experience in designing and fabricating. If the fastener you need can't be supplied from our extensive stock, we'll study your assembly operation and make the right one for the job.

Remember—for any fastening operation, it's a smart move to call in RB&W. You can count on RB&W bolts, nuts, screws and rivets for uniform accuracy, dependability and physical properties. And you can also count on fast service from RB&W's strategically located plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Pittsburgh, Detroit, Chicago, Dallas, San Francisco. Sales agents at: Portland, Seattle. Distributors from coast to coast.

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

2 12

*George K. Garrett Co., Philadelphia, Pa.

RB&W 108 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

EADS JOHNSON JR.
. . . new president, Southern Wheel Div.

EDWIN H. WALKER
. . . McKinnon Industries president

RAY BISHOP
. . . works mgr., J. I. Case Co.

named vice president-research and development, a newly created office.

Eads Johnson Jr., formerly executive vice president, was promoted to president, **Southern Wheel Division**, American Brake Shoe Co., New York. He succeeds **William F. Cutler**, retired.

William Beeson was elected manager of sales, Philadelphia territory, **Jessop Steel Co.** He succeeds **H. E. Doughty**, retired.

Cooper-Bessemer Corp. appointed **Tom McMichan**, works manager, and **Frank Stevenson**, assistant works manager, as special assistants to the president. They are stationed at the headquarter plant in Mt. Vernon, O. **Willard Luli**, former production manager, was named works manager at Grove City, Pa., plant.

Edwin H. Walker was elected president and general manager, **McKinnon Industries Ltd.**, subsidiary of General Motors Corp., St. Catharines, Ont. He succeeds **Thomas J. Cook**, retired. Mr. Walker has been assistant to Mr. Cook.

Harold Wolf was elected vice president-sales and **Stanley Steele** treasurer, **Roth Steel Warehouse Co.**, Chicago.

Frank P. Agenten was appointed chief engineer, **Precision Machine Co.**, Milwaukee. Until recently he was assistant to the president at Milwaukee Equipment Mfg. Co.

Ray Bishop was promoted from superintendent to manager of the Rock Island, Ill., Works of **J. I. Case Co.**

Harold T. Clark was named assistant director of research to supervise all divisions of research at **Jones & Laughlin Steel Corp.**, Pittsburgh. **George H. Enzian** was promoted to manager, metallurgical research.

Crucible Steel Co. of America, Pittsburgh, appointed **Richard L. Roberson** assistant manager, Indianapolis branch, and **M. G. Brown** to a similar position at Los Angeles.

Maremont Automotive Products Inc., Chicago, elected **Arnold H. Maremont** president to succeed **Howard E. Wolfson**, now chairman of the board. The new president formerly was executive vice president, treasurer. He also is a director. **Jerome M. Comar**, vice president-secretary, was named executive vice president. **Milton A. Wolfson** was named to the new position of senior vice president.

Duell Gabbert was made purchasing agent and traffic supervisor, Chicago district, **United States Steel Corp.'s** products division.

Newly created New York sales office of **Cleaver-Brooks Co.**, devoted principally to boiler sales, is located in the Daily News building and managed by **Frank L. Phillips**. A second office was created to handle the sale of evaporator equipment, centrifugal and axial flow compressors and other special products under supervision of **James G. Brooks**, vice president. It continues, for the present, to be located at 50 Church St.

Donald L. DeVries was made manager, precipitator department, metal products division, **Koppers Co. Inc.**, Baltimore.

R. L. Wells was appointed assistant manager of engineering and **P. G. DeHuff** manager of engine design, aviation gas turbine division, **Westinghouse Electric Corp.**, Philadelphia.

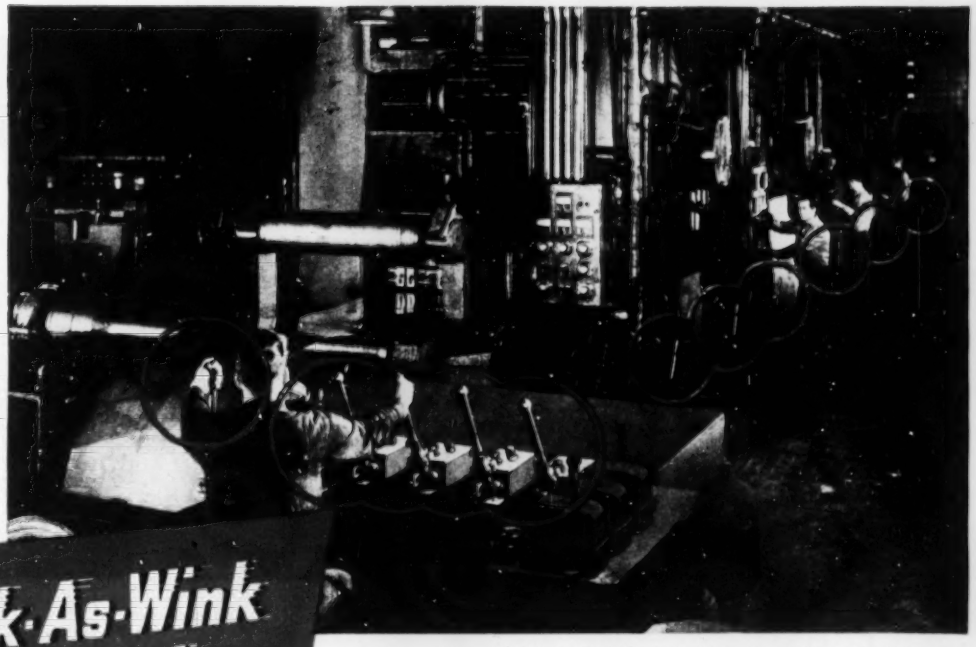
Farrel-Birmingham Co. Inc., Ansonia, Conn., appointed **Samuel S. Board Jr.** director of research at its Buffalo plant.

David A. Blevins was appointed production engineering supervisor, **Electric Regulator Corp.**, Norwalk, Conn. He formerly was chief engineer, Shank Metal Products Co.

Dr. Walter R. Hibbard Jr. was appointed manager of the newly established alloy studies section in **General Electric Co.'s** metallurgy research department, Schenectady.

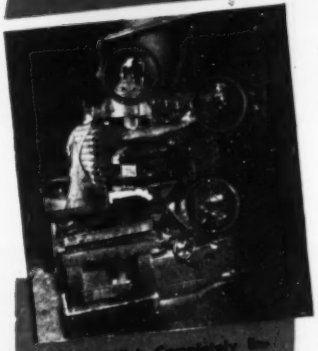
Food Machinery & Chemical Corp., San Jose, Calif., appointed **George R. Sommers** director of marketing, machinery divisions. He formerly was with Sylvania Electric Products Inc.

Hy-Pro Tool Co., New Bedford, Mass., appointed **Harry B. Hubbard** direct factory representative in



View of Quick-As-Wink Hydraulic Valve Installation in Steel Mill

Quick-As-Wink Control Valves



Quick-As-Wink Completely Enclosed Diaphragm Operated Air Valves on Core Making Machine

Quick-As-Wink Solenoid Operated Air Valves on Battery of Heavy Duty Presses

smooth month-after-month performance

minimizes your down-time

● Gambling with breakdowns, lost production and plant tie-ups just doesn't pay. Play safe! Install Quick-As-Wink Valves on *all* your air and hydraulic controls. Positive and fast acting, all operating parts of Quick-As-Wink Valves are in pressure balance, eliminating any tendency to creep or crawl. Quick-As-Wink Valves can be serviced easily and quickly, during normal maintenance periods, usually without disturbing connecting piping. There is no metal to metal seating. All parts are standardized and readily interchangeable, avoiding the delay of returning valves to the factory for servicing, and the expense of maintaining large standby inventories. Standardize on Quick-As-Wink — and get *all* the advantages that *only* Quick-As-Wink Valves can give you.

Quick-As-Wink

AIR AND HYDRAULIC

Control Valves

Hand, Foot, Cam, Diaphragm and Solenoid Operated

Mfd. by C. B. HUNT & SON, INC., 1911 East Pershing St., Salem, Ohio

FOR SECURITY IN THE FIELD

Porter Plug Valve Bodies are **MEEHANITE CASTINGS**

The Porter Valve Division of the H. K. Porter Company, Tulsa, Oklahoma, build a line of lubricated plug valves, Fig. 1, all of which are pressure castings subjected to a variety of combined and severe service stresses in the field. These stresses include high pressure, tensile and compressive forces, impact and distortion. The company, in describing their reason for the Meehanite specification states, "Porter finds Meehanite Metal provides an extra protection against cracking."

A not too infrequent problem in pipe line installation is the cracking of valve body flanges. This problem arises when the pipe line is not true. The combined high tensile strength, toughness and pressure tightness due to uniform density provided by Meehanite castings, Fig. 2, make them the logical solution to the problem involved. Porter Meehanite Valve Bodies are produced in sizes ranging from ½ inch to 24 inches.

This application is another example of how "Meehanite Bridges the Gap Between Cast Iron and Steel"—combining the better properties of both.

MEEHANITE FOUNDRIES

American Brake Shoe Co.	Mahwah, New Jersey
The American Laundry Machinery Co.	Rochester, New York
Atlas Foundry Co.	Detroit, Michigan
Banner Iron Works	St. Louis, Missouri
Barnett Foundry & Machine Co.	Irvington, N. J. and Dover, N. J.
E. W. Bliss Co.	Hastings, Mich. and Toledo, O.
Builders Iron Foundry	Providence, Rhode Island
Compton Foundry	Compton, Calif.
Continental Gin Co.	Birmingham, Alabama
Crawford & Doherty Foundry Co.	Portland, Oregon
The Cooper Bessemer Corp.	Mt. Vernon, Ohio and Grove City, Pa.
De Laval Steam Turbine Co.	Trenton, New Jersey
M. H. Detrick Co.	Newark, N. J. and Peoria, Ill.
Empire Pattern & Foundry Co.	Tulsa, Oklahoma
Farrel-Birmingham Co., Inc.	Ansonia, Connecticut
Florence Pipe Foundry & Machine Co.	Florence, New Jersey
Fulton Foundry & Machine Co., Inc.	Cleveland, Ohio
General Foundry & Manufacturing Co.	Flint, Michigan
Greenlee Foundry Co.	Chicago, Illinois
The Hamilton Foundry & Machine Co.	Hamilton, Ohio
Hardinge Company, Inc.	New York, New York
Hardinge Manufacturing Co.	York, Pennsylvania
Johnstone Foundries, Inc.	Grove City, Pennsylvania
Kanawha Manufacturing Co.	Charleston, West Virginia
Koehring Co.	Milwaukee, Wisconsin
Lincoln Foundry Corp.	Los Angeles, California
London Concrete Company, Ltd.	Brantford, Ontario
E. Long Ltd.	Orillia, Ontario
Otis Elevator Co., Ltd.	Hamilton, Ontario
Palmyra Foundry Co., Inc.	Palmyra, New Jersey
The Henry Perkins Co.	Bridgewater, Massachusetts
Pohlman Foundry Co., Inc.	Buffalo, New York
Rosedale Foundry & Machine Co.	Pittsburgh, Pennsylvania
Ross-Meehan Foundries	Chattanooga, Tennessee
Shenango-Penn Mold Co.	Dover, Ohio
Smith Industries, Inc.	Indianapolis, Ind.
Steadard Foundry Co.	Worcester, Massachusetts
The Stearns-Roger Manufacturing Co.	Denver, Colorado
Traylor Engineering & Mfg. Co.	Allentown, Pennsylvania
Valley Iron Works, Inc.	St. Paul, Minnesota
Warren Foundry & Pipe Corporation	Phillipsburg, New Jersey

"This advertisement sponsored by foundries listed above."

Write for our new Bulletin #37 entitled— "Proof That Meehanite Bridges the Gap".

MEEHANITE®
NEW ROCHELLE, N. Y.

MEEHANITE MEANS BETTER CASTINGS

FRANCIS J. FRASOR
. . . Diversey purchasing agent

FRANK T. SHIBA
. . . a sales mgr., Builders Structural

Connecticut, **Earl C. Jex Jr.** direct representative in Michigan operating out of Detroit, and **Francis T. Thorley** eastern district manager.

Francis J. Frasor was named purchasing agent, **Diversey Corp.**, Chicago. He served as procurement co-ordinator for Koppers Co. Inc. in its Chicago office.

Associated Research Inc., Chicago, appointed **Donald A. Davenport** chief engineer and **Paul Wade** purchasing agent.

Charles W. Decker Jr. was named assistant sales manager, engine division, **Le Roi Co.**, Milwaukee.

Olaf O. Roberts was appointed district sales engineer in the Chicago area for **Granco Steel Products Co.**, subsidiary of Granite City Steel Co.

Ralph E. Campbell was made Pittsburgh district field engineer, **SKF Industries Inc.**

Frank T. Shiba was appointed manager of sales, structural and ornamental divisions, **Builders Structural Steel Corp.**, Cleveland.

Robert H. Murphy was appointed assistant production control manager, AC Spark Plug Division, **General Motors Corp.**, Flint, Mich.

John A. Borman joins **Clark Equipment Co.** industrial truck division, Buchanan, Mich., as assistant to the vice president. He will work on engineering and production problems. For the last three years he has been with Baker-Raulang Co. **Russell Hastings**, formerly with Lewis-Shepard Co., joins Clark as assistant to A. O. Williams in directing engineering activities.

Robert D. Weber was made director of engineering for both **Rosan Inc.** and **Rosan Engineering Co.**, Newport Beach, Calif. **Arthur I. Lusk** was made chief engineer of both companies. **Brig. Gen. Stanley E. Ridderhof**, U. S. Marine Corps, ret., joins Rosan Inc. as assistant to the president. **Harry N. Bailey** was elected vice president, Rosan Thread Division, Rosan Engineering Co. Colonel Bailey formerly was the Air Force regional representative, Los Angeles region.

Howard C. Holmes, former Detroit district manager, was promoted to assistant general sales manager, **Kaiser Aluminum & Chemical Sales Inc.** His headquarters are at Chicago. **Mortimer C. Crockett** was named to take charge of the Detroit sales office with **John J. Cassidy** succeeding him as assistant district manager, New York.

N. A. Lamberti was appointed director of materials and **L. S. Peck** director of industrial relations by **McCulloch Motors Corp.**, Los Angeles.

Eugene Dirschel was appointed works manager, **Roberts-Gordon Appliance Corp.**, Buffalo plant. **John Crim** was named assistant works manager.

Paul L. McCullough Jr. was made sales manager, electro-alloys division, **American Brake Shoe Co.**, New York.

O. W. Carrico, formerly assistant plant manager, Chicago division, **Houdaille-Hershey Corp.**, was appointed plant manager.

Lewis T. Gibbs was made assistant manager of sales in **U. S. Steel Corp.'s** high strength steel division, Pittsburgh.

Sharon Steel Corp., Sharon, Pa., elected new directors: **J. K. Hodnette, D. R. Linsley, F. J. Manheim.**

OBITUARIES . . .

Owen M. Fox, 67, former advertising manager, **Cleveland Cliffs Iron Co.**, Cleveland, associated with the firm 20 years, died Apr. 1. He retired three months ago.

Louis Klow, 77, co-founder and treasurer, **Grand Sheet Metal Products Co.**, Melrose Park, Ill., died Mar. 25.

John G. McKinnon, 81, former plant manager, **Pease Foundry Co. Ltd.**, Brampton, Ont., died recently.

Joseph S. Cowan, 59, manager of government business at Washington for **National Electric Products Corp.**, Pittsburgh, died Mar. 31.

Otto A. Pfleger, 65, for 11 years president, **Radiant Tool & Die Corp.**, Chicago, died Mar. 30.

Robert E. Dawe, 55, quality control director, **North American Aviation Inc.**, Los Angeles, died Mar. 28.

Hugh J. Beacn, 60, president, **Flexible Steel Lacing Co.**, Chicago, died Mar. 31.

C. B. Bohn, 73, founder and board chairman, **Bohn Aluminum & Brass Corp.**, Detroit, died Apr. 2.

J. Gordon Turnbull, 62, president, **J. Gordon Turnbull Inc.**, died Apr 1 at his home in Los Angeles.

Acquires Convair Control

General Dynamics buys controlling interest in western aircraft company from Atlas Corp.

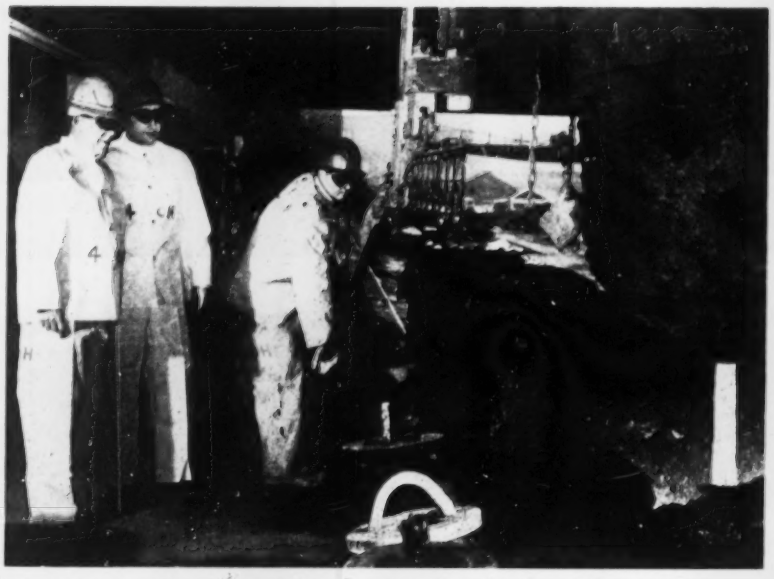
GENERAL DYNAMICS Corp. will acquire a controlling interest in Consolidated Vultee Aircraft Corp., San Diego, Calif., with the purchase of Convair stock from Atlas Corp. General Dynamics will pay $8.7 million and exchange 20,000 shares of its common stock for the 400,000 shares of Convair.

The purchase represents about 17 per cent of Convair's outstanding stock. Total value of the transaction amounts to about $10 million.

For Defense Purposes—Association of General Dynamics and Convair joins two companies with a wide range of products, largely for defense. Sales of General Dynamics reached $110 million last year, compared with $82 million in 1951. Convair sales totaled $390 million in 1952, and current backlog is over $1 billion.

General Dynamics is parent company of Canadair Ltd., aircraft manufacturer of Canada, building transports and jet planes. The electric boat division of General Dynamics is working on a contract for an atomic submarine, besides other submarine contracts.

Atlas has not reported what it will do with funds from the sale.



U. S. Steel's Gary Works Produce 150-Millionth Ton

Steelmen watch the 150-millionth ton of steel produced at Gary Ind., Works of U. S. Steel Corp. Steel poured into these ingot molds helps attain that record, accomplished since 1909. Since then, highest yearly output was 6,387,000 tons in 1951. John H. Vohr, left, general superintendent, and Edgar B. Speer, center, division superintendent of steel production, observe the pouring

Opens Birmingham Office

Mount Vernon Steel Corp., Mount Vernon, N. Y., opened a southeastern sales and warehouse headquarters in Birmingham.

Army Project for Goodyear

Goodyear Aircraft Corp., Akron, will design and develop a new field artillery carriage for the Army. Carriages will be lighter and more functional than present units.

Parker Buys Accessory Line

Parker Appliance Co., Cleveland, purchased the line of hydraulic accessories manufactured and in process of development by Sundstrand Machine Tool Co., Rockford, Ill.

Parker already produces hydraulic accessories for aircraft and mobile equipment used in materials handling, in road building and in farming.

Operates Packing Plant

E. F. Houghton & Co., Philadelphia, is operating a new plant for manufacture of synthetic rubber packings. The managing company is Houghton Vix-Syn Co., Hopkins, Minn.

Reynolds Names Distributor

Reynolds Metals Co. announces that Hardware & Metal Supply Co., Philadelphia, will distribute Reynolds architectural aluminum mill products. Mapes & Sprowl Inc., Union, N. J., will represent Reynolds in the metropolitan New York area.

McCormick Plans Warehouse

McCormick Steel Co., Houston, will begin construction of a $175,000 warehouse soon in Oklahoma City, Okla.

While the Texas firm is preparing to move into Oklahoma City, Capitol Steel & Iron Co. will move from that city into Texas. Construction of a new plant containing 160,000 square feet is nearly complete in Houston.

Alpha To Sell Outside U. S.

Alpha Tool & Supply Co., Closter, N. J., expanded its distribution to include Canada and Mexico. The company imports precision-made British industrial products.

CF&I Opens Mine Section

Colorado Fuel & Iron Corp. is now taking coal from the east portal of its Allen mine near Stonewall, Colo. Coal production from the mine's west portal started in 1952 and has been increasing steadily.

The coal is shipped to CF&I's Pueblo, Colo., steel mills.

Opens Trailer Factory

The first unit of a trailer factory was put in operation by Coach Specialties Inc. at Anaheim, Calif.

Grateful for Suggestions

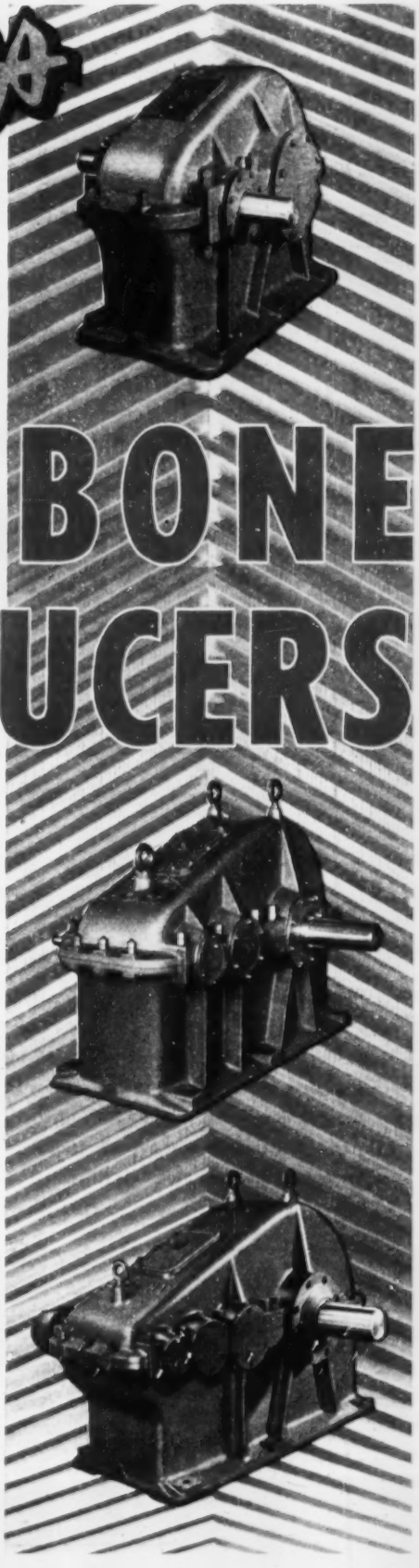
Timken Roller Bearing Co., Canton, O., awarded $46,045 to supervisors and production employees

D.O.James

Established 1888

CONTINUOUS-TOOTH

HERRINGBONE GEAR REDUCERS



The Gear with the Backbone

Some of the Many Proven *On-the-Job* Advantages of This Type of Gear Reduction Are as Follows

1. No side thrusts.
2. No avoidable deflections, distortions.
3. No necessity for bearings having thrust capacity.
4. Stronger teeth, due to the arch-like construction.
5. Greater load-carrying capacity due to utilization of the full width of face.
6. More silent and smoother action due to absence of distortion.
7. No impact stresses due to avoidance of sideways deflections.
8. Uniform load across face due to balanced thrusts of the opposing helices.
9. Better lubrication due to the oil film formed by "wedge action" of the teeth.
10. Less costly to produce due to the absence of side thrusts and no necessity for heavy sections to reduce deflections — also due to the simultaneous utilization of two cutting tools.
11. Can be substituted for straight tooth gears without any change in design of bearings or housings, or increase in face width, or alteration in pitch.
12. No axial float is necessary because the "V" shaped herringbone teeth wedge automatically into the mating gear thus eliminating all sideways motion and the consequent rubbing action of a screw-like nature existing in single helical gears which result in pitting and wear at relatively low loads.
13. Less expensive gear housings and bearing housings due to balanced thrusts.
14. Large helical angles are used; thus the full benefit of the helical principle is obtained.
15. Tooth deflection, though very small, results in the greatest load being carried by the strongest section.

All Gears are Generated Continuous-tooth Herringbone Gears, 20° pressure angle, 30° helix angle

Send for Catalog 40-C

D.O.JAMES GEAR MANUFACTURING CO.

Since 1888 • Makers of Every Type of Gear and Gear Reducers

1140 W. MONROE STREET • CHICAGO 7, ILLINOIS

It's hard to beat a specialist in his own field!

with CLEVE-WELD, it's STEEL RINGS

For any type of circular rolled or welded parts in quantity, chances are *you can't beat Cleve-Weld*...for quality, uniformity and price!

Whatever your requirements in this specialized field, it will pay you to consult Cleve-Weld. Forward your drawings and specs for free estimate. Out of their broad experience, Cleve-Weld engineers can frequently offer suggestions for slight design changes that will add strength to the part...or reduce its cost of production. Write for general catalog today.

See AMF's exciting, new television show, **"OMNIBUS".** Check your local paper for time and channel.

CLEVE-WELD

Specialists in

RINGS • BANDS • WELDMENTS

THE CLEVELAND WELDING COMPANY
West 117th St. & Berea Road, Cleveland 7, Ohio

a Subsidiary of

AMERICAN MACHINE & FOUNDRY COMPANY, NEW YORK

in 1952 for 1120 suggestions toward increasing production, cutting waste and improving safety.

Powers Moves Installations

Powers Wire Products Co. removed its Los Angeles plant and offices to Monterey Park, Calif.

Chemical Plant Finished

Eagle Chemical Co. completed a plant for production of desiccants and industrial coatings in Mobile, Ala.

A-C Names Distributor

George L. Smith & Co., Milwaukee, will distribute motors and centrifugal pumps in sections of Wisconsin and Michigan for Allis-Chalmers Mfg. Co., Milwaukee.

Opens Sales Office

Pennsylvania Falk Chemical Co., Pittsburgh, opened a general sales office in the Farmers Bank building, Pittsburgh.

Receives Second TVA Order

Westinghouse Electric Corp.'s Sturtevant Division received a $406,000 order for fan equipment from the Tennessee Valley Authority's Rogersville, Tenn., station. A previous order totaling $750,000 was placed with Sturtevant earlier this year for use at TVA's Kingston, Tenn., station.

Offices for Perry Kilsby

Perry Kilsby Inc. has new offices and a warehouse at 2501 South Malt Ave., Los Angeles.

Toledo Plant Opened

Master Chemical Corp., Toledo, O., opened new offices and plant in Toledo. Master Chemical manufactures a water soluble coolant for machine tools.

Win Safety Awards

The National Constructors Association gave awards to eight member companies for outstanding safety records last year.

Winners were Bechtel Corp., San

Just as a goalie needs protection...

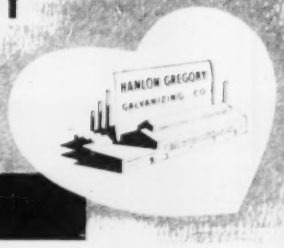
IRON and STEEL
Need **PROTECTION**

If your product is made of iron or steel, and exposed to the elements, protect it against the ravages of rust by Hot-Dip Galvanizing — the best possible rust preventive when applied by Hanlon-Gregory. For longer life, greater uninterrupted service and substantial savings in maintenance, specify Hot-Dip Galvanizing . . . SEAL IT IN ZINC.

HANLON-GREGORY GALVANIZING COMPANY

Pittsburgh, Pennsylvania
The World's largest Job Galvanizing Plant
A. J. DIEBOLD, President

IN THE HEART OF THE STEEL INDUSTRY

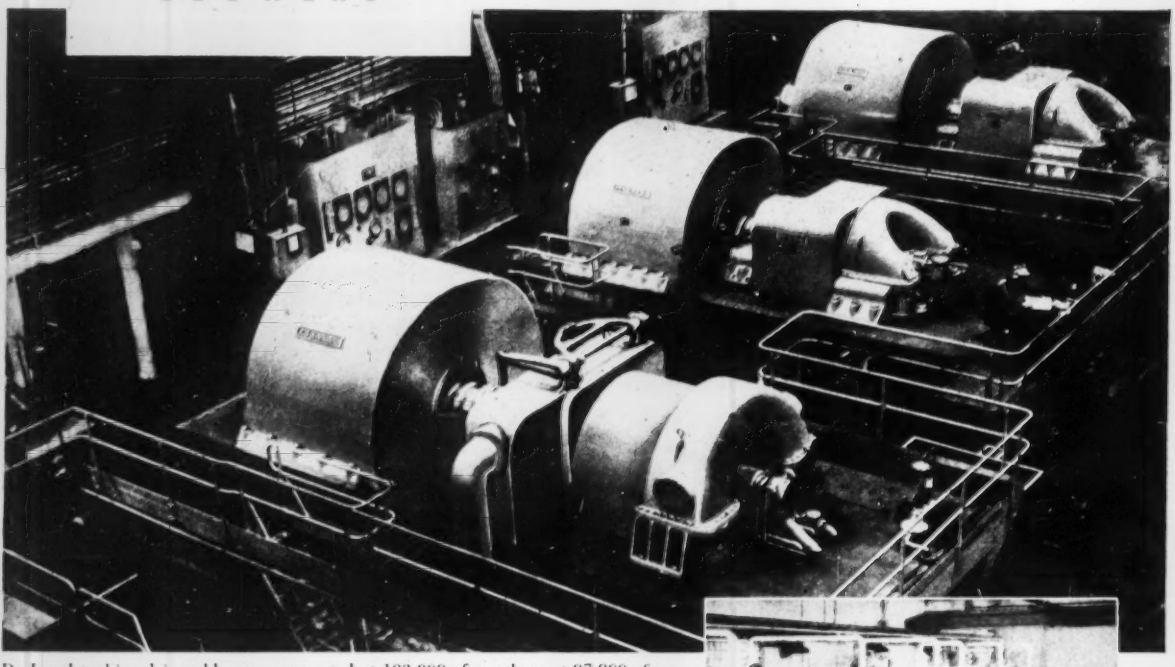


HOT DIP GALVANIZING

galvanizing . . . pickling . . . painting . . . oiling

DE LAVAL
STEEL MILL BLOWERS

never take a "breather"

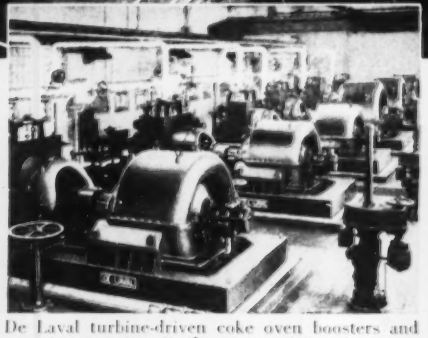


De Laval turbine-driven blowers: one rated at 123,000 cfm, others at 97,800 cfm.

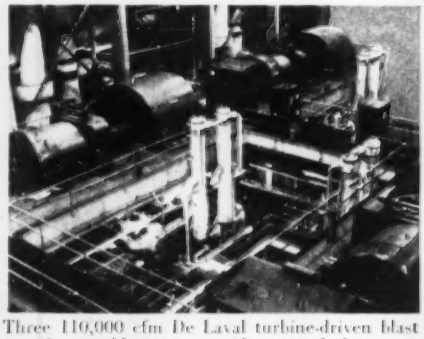
These De Laval turbine-driven blast furnace blowers and coke oven boosters and exhausters stay on the job 'round the clock in steel plants all over the country.

There are good reasons for this power-saving dependability. De Laval heavy-duty blowers are built to take punishment. Rugged casings, husky, perfectly balanced rotors, cylindrically seated bearings are design features that reduce maintenance and insure long continuous service. Remember, there's no divided responsibility—both turbine and blower are De Laval designed and De Laval made.

For a quarter of a century, De Laval has pioneered in advanced blower engineering designs and practices. In fact, the first turbine-driven units to use steam at pressures above 700 psig and temperatures above 825F TT were manufactured by De Laval. Centrifugal blowers and compressors are built in single and multi-stage types for delivering air in volumes as high as 125,000 cfm or more for all classes of service in steel, gas and coke plants. Put this experience to work for you. Discuss your specific applications with a De Laval Sales Engineer.



De Laval turbine-driven coke oven boosters and exhausters installed in an eastern steel mill.



Three 110,000 cfm De Laval turbine-driven blast furnace blowers at a midwest steel plant.

DE LAVAL *Centrifugal Blowers*

DE LAVAL STEAM TURBINE COMPANY
860 Nottingham Way, Trenton 2, New Jersey

DL169

Lift Is Timesaver

A hydraulic lift mounted on a Chevrolet truck saves time and labor in laying heavy water lines. Here one such truck is operated by Gary-Hobart Water Corp., Miller, Ind. The driver works controls from his dashboard

---

Francisco, H. K. Ferguson Co., Cleveland, Fluor Corp. Ltd., Los Angeles, Lummus Co., New York, Arthur G. McKee & Co., Cleveland, Rust Engineering Co., Pittsburgh, Procon Inc., Chicago and Stone & Webster Engineering Corp., Badger Process Division, Boston.

Dravo Receives Order

Dravo Corp., Pittsburgh, will construct facilities for unloading coal barges at the Philip Sporn plant of the Ohio Power Co. and the Appalachian Electric Power Co. at Graham Station, W. Va.

Employees Buy Company

Two veteran employees of Buffalo Bearings Inc., Buffalo, purchased the company. Floyd H. Schrader will be president and secretary and James P. Cavanaugh is vice president and treasurer.

Harrisburg Buys Heckett

Stockholders of Harrisburg Steel Corp., Harrisburg, Pa., approved acquisition of Heckett Engineering Inc., Butler, Pa., and its wholly-owned subsidiary, Heckett International Inc.

Heckett Engineering operates

JOHNSON
Universal Bronze

One customer writes: "I always check over the size list of UNIVERSAL BRONZE Bars in the Johnson Catalog before ordering. No use machining away bronze when I can get the right machined diameter from stock. That saves me money two ways—I buy no more metal than I need—and I cut machine set-ups and machine time." Johnson UNIVERSAL BRONZE is completely machine finished inside diameter, outside diameter, and ends. There are 349 different combinations of sizes in cored bars, and 33 sizes of solid bars.

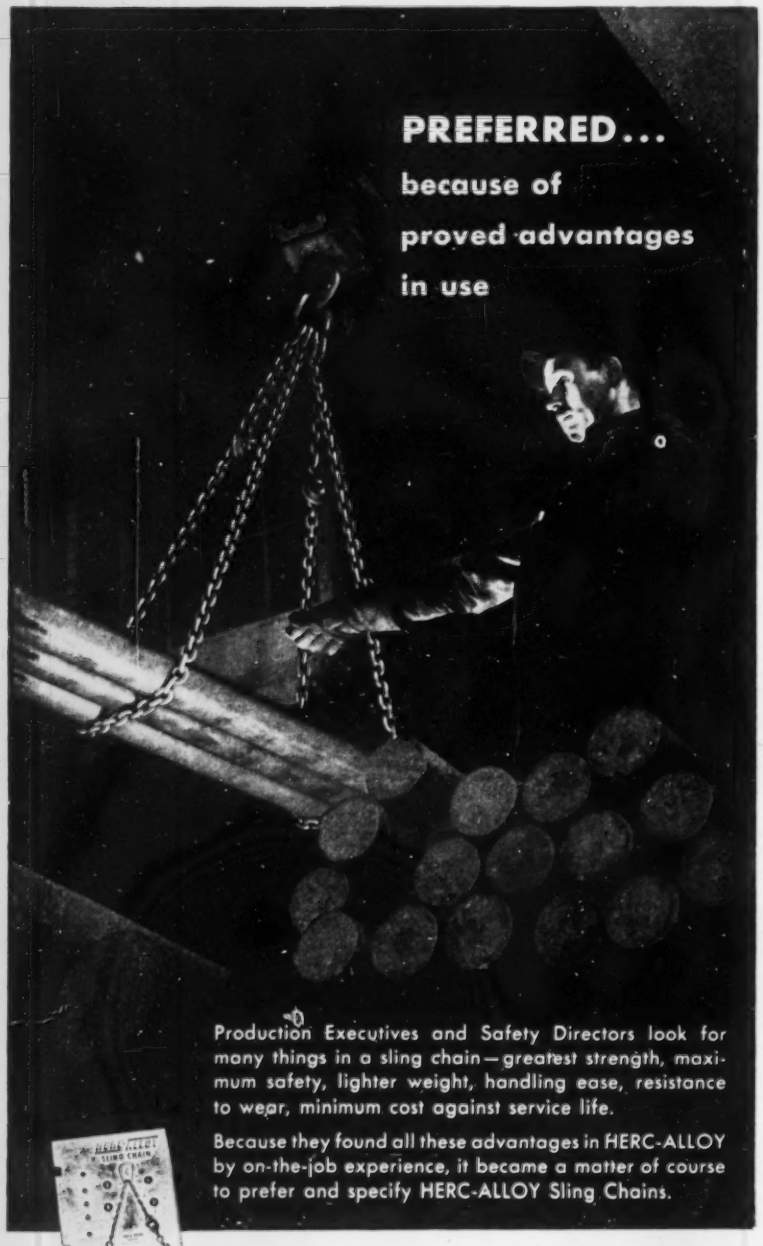
You probably have more applications in your plant for UNIVERSAL BRONZE than you realize. Other manufacturers use it for trolley wheels, sheaves, rollers, guides, spark-proof pinions, special pipe fittings, and air tool tips, as well as for bushings, bearings, thrust plates and washers. Since you can buy it in nearly any size you require, you will save much machining time. Its free-machining properties make further savings. Investigate Johnson UNIVERSAL BRONZE—ask your local Johnson distributor.

JOHNSON BRONZE COMPANY
550 South Mill Street • New Castle, Pa.

JOHNSON JB BEARINGS
Sleeve-Type

OTHER BEARING TYPES:
Standard Stock Size GP Bearings • Electric Motor Bearings • Graphited Bearings • Self-Lubricating Powder Metallurgy Bearings • Babbitt Metal

HERC-ALLOY
SLING CHAINS



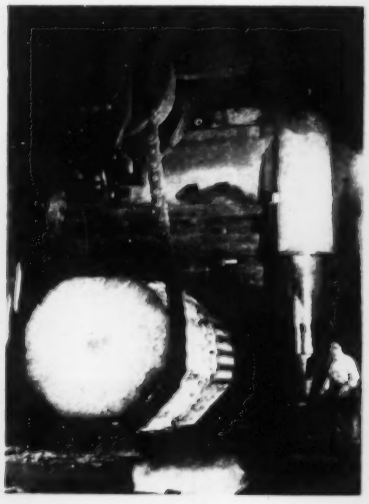
Production Executives and Safety Directors look for many things in a sling chain—greatest strength, maximum safety, lighter weight, handling ease, resistance to wear, minimum cost against service life.

Because they found all these advantages in HERC-ALLOY by on-the-job experience, it became a matter of course to prefer and specify HERC-ALLOY Sling Chains.

Write for illustrated Data Book No. 3 which contains helpful information on sling chain selection and use.

COLUMBUS McKINNON CHAIN CORPORATION
(Affiliated with Chisholm-Moore Hoist Corp.)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
District Offices: New York • Chicago • Cleveland
Other Factories at Angola, N. Y., Dixon, Ill., St. Catharines, Ont., Can., and Johannesburg, South Africa

See us at Booth No. 1526—Philadelphia—May 18-22
5TH NATIONAL MATERIAL HANDLING EXPOSITION



Forges Huge Ingot

U. S. Steel Corp.'s Homestead, Pa., works forge a 500,000-pound ingot for use in the Air Force heavy press program. It will be reduced two-thirds in diameter and lengthened to 63 feet, to be used as a tie rod for a 20,000-ton extrusion press to produce intricate parts for airplanes

slag reclamation facilities in 11 steel plants in the U. S. and Canada.

New Chicago Office

Pratt & Whitney Division of Niles-Bement-Pond Co., West Hartford, Conn., relocated its Chicago branch office at 4649 West Fullerton Ave.

Purchases Leader Assets

Benjamin Electric Mfg. Co., Des Plaines, Ill., purchased certain assets of Leader Electric Co., Chicago. Leader products are to be manufactured and sold by the Leader Division of Benjamin Electric.

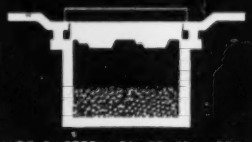
Louchheim Distributes Kitchens

Stuart F. Louchheim Co., Philadelphia, will distribute steel kitchens manufactured by Berger Mfg. Division of Republic Steel Corp., Canton, O.

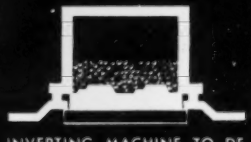
NPA Lists Tool, Die Makers

The Office of Small Business, National Production Authority, has published a directory of independent tool and die manufacturers. The material was gathered by the

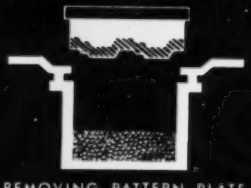
LOADING THE MOLD-MAKING MACHINE WITH RESIN-SAND MIXTURE.



HOT PATTERN PLATE CLAMPED TO MOLD-MAKING MACHINE.

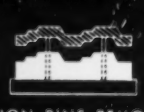


INVERTING MACHINE TO DEPOSIT RESIN-SAND MIXTURE ON HOT PATTERN.



REMOVING PATTERN PLATE WITH ADHERED SAND-RESIN CRUST.

OVEN-CURING FRESHLY FORMED MOLD HALF.



EJECTION PINS REMOVING CURED MOLD HALF FROM PATTERN PLATE.

How SHELL MOLDING Pays off!

The shell molding process offers notable economies to the producer and user of ferrous and non-ferrous castings on short as well as long runs.

LONG RUN PRODUCTION. Shell molds yield castings almost pattern-smooth, with tolerances as close as .003 to .005 inches per inch. This feature greatly reduces finishing costs. Moreover, there is a high percentage of sound, uniform castings, with fewer rejects.

SHORT RUN PRODUCTION OF COMPLEX SHAPES. Such castings normally require finishing entirely by hand—at prohibitive cost. Shell molds are made of a resin-sand mixture that is perfectly suited to forming on intricate pattern plates. Shell molds can be stored without deterioration for intermittent production scheduling. They retain their shape until used.

SELECTION OF PROPER RESINS. BAKELITE Phenolic Resins are used to bond the fine-grained sands from which the thin, lightweight shell molds are made. Bakelite Company has developed several resins for this process, of which two meet most requirements. One provides resistance to distortion during the initial heat of pouring. The other provides accurate reproduction of intricately-detailed patterns, even those requiring deep draws.

ENGINEERING GUIDANCE. Selection and use of the correct bonding resin is important to successful shell molding. It is a step for which your foundry department or supplier may need expert guidance. Bakelite Company engineers, located in principal cities, are ready to help. Write Dept. PK-49.

BAKELITE

PHENOLIC RESINS FOR SHELL MOLDING

TRADE MARK

BAKELITE COMPANY

A Division of
Union Carbide and Carbon Corporation

UCC

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Bakelite Company (Canada) Ltd., Belleville, Ont.

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When you're looking for custom forgings, make your first source of supply American Forge. We quickly and efficiently forge, upset, bend, thread or machine your custom items. Our condensed catalog should be in your file for quick reference—write for it today!

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Forged shafts · pinions · gear blanks · steel rings · connecting rods · discs · heavy bolts up to 6" dia. · 5 to 100 ton capacity mill hooks · ratchets · load binders · hand and automatic tongs to your specifications

"Forgings for industry since 1890"

Cleaning by Sound

Sound waves, newly developed method of industrial cleaning, are being used at Minneapolis-Honeywell Regulator Co., Minneapolis, to wash delicate bearings. To be used for high-pressure gyroscopes, the bearings are placed in a beaker holding cleaning fluid. Later high-intensity ultrasonic sound waves will pass through the agitated beaker, cleaning the bearings

---

National Tool & Die Manufacturers Association.

About 1500 producers of special dies, molds, jigs, fixtures, gages and machines are listed. Copies can be purchased from the Department of Commerce, Division of Printing Service, Distribution Section, Washington 25.

Alcoa Plans Presses

Aluminum Co. of America plans to install two extrusion presses, at a cost of $2.7 million, in its Vancouver, Wash., plant. The extrusion plant will contain 80,000 square feet of manufacturing space. Plant employment will be increased to 2000.

Award Crane Contract

Government engineers awarded a crane contract for Lookout Point dam, Portland, Oreg., to Harnischfeger Corp., Milwaukee.

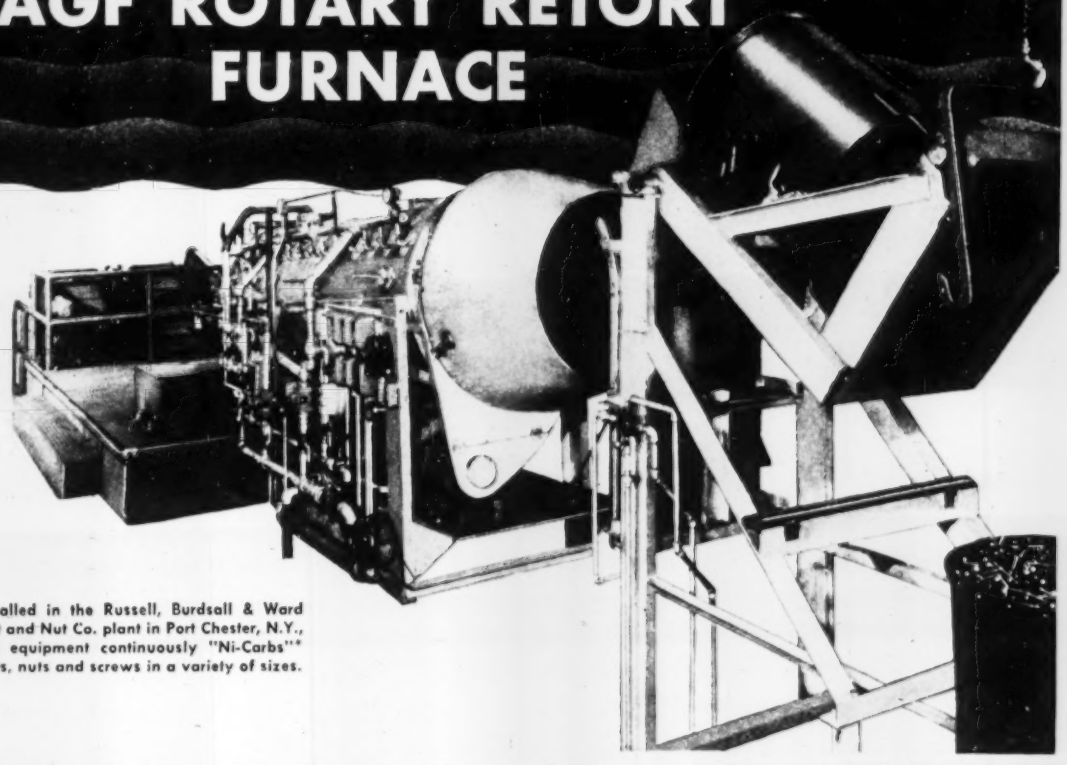
Hooker To Build Addition

A permit for a proposed $396,000 plant addition was issued to Hooker Electro-Chemical Co., Tacoma, Wash. The general contract was

NEW! Oil or Water COMBINATION QUENCH TANK

increases the versatility of the

AGF ROTARY RETORT FURNACE



Installed in the Russell, Burdsall & Ward Bolt and Nut Co. plant in Port Chester, N.Y., this equipment continuously "Ni-Carbs"* bolts, nuts and screws in a variety of sizes.

AGF Continuous Rotary Retort Furnaces and Quench Tanks with the NEW "Dual Quench" use—either oil or water—at the flip of a handy control lever. "That's modern heat treating."

VERSATILITY

The illustrated installation of AGF Equipment approaches the ultimate in heat treating efficiency. 400 to 1000 lbs. of bolts, nuts and screws, depending upon the size and the heating cycle need, is the dependable hourly production. A quick change in heating cycle or quench can be instantly made from simple controls.

UNIFORMITY OF PRODUCT is assured by--

- Retort rotation thoroughly mixing the work.
- Positive control and maintenance of atmosphere in the retort.
- Small amounts of work are constantly being quenched as contrasted with other types of atmosphere furnaces where large batches hinder proper quenching.

ECONOMY

The overall economies of operation afforded by AGF Rotary Furnaces result in substantially lower cost per unit of work heat treated than is possible with any other type of furnace.

Safe, clean, fast and easy to use—it will pay you to investigate AGF FURNACES and Dual Quench Tanks.

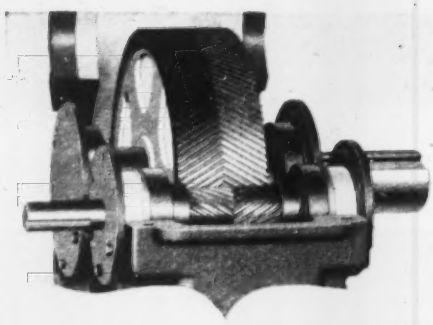
*The Original Ammonia-Gas Case Hardening Process.

Send your heat treating problem to AGF "PIONEER" furnace builders and ask for AGF AUTOMATIC FURNACE DATA.

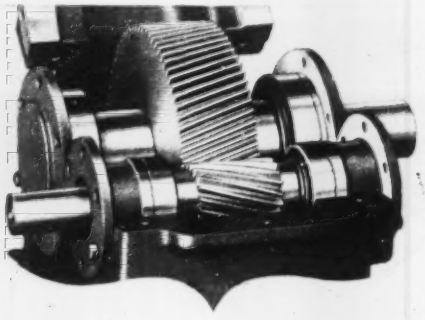
AMERICAN GAS FURNACE CO. PIONEERS 1878

AMERICAN GAS FURNACE CO.

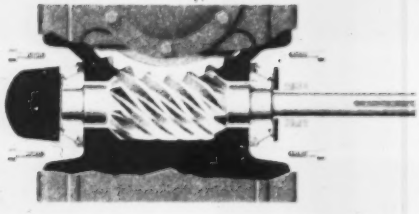
996 LAFAYETTE ST., ELIZABETH 4, N. J.



A Complete Line of Speed Reducers



HERRINGBONE · HELICAL · WORM GEAR



for Unbiased Selection of Type

● Horsburgh & Scott Speed Reducers are available in 3 general groups, 12 distinct types in many sizes and hundreds of standard ratios. Many considerations, such as speed of driving and driven shafts, shape of housing and characteristics of drive, point definitely to one specific unit as the best drive for a particular duty. Having such a complete line to select from, engineers have exceptional freedom for unbiased selection of the right reducer for the job.

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U. S. A.

Send note on Company Letterhead for Speed Reducer Catalog 46

placed with Roy T. Earley Co., Tacoma.

Utah Begins AEC Facilities

The Atomic Energy Commission awarded a contract for the first phase of construction of ground facilities at the Arco reactor testing station, Idaho Falls, Idaho, to Utah Construction Co., Salt Lake City, Utah, on a bid of $4,583,028.

Building, pumping facilities and tanks are involved in the contract.

Lockheed Sales Soar

Lockheed Aircraft Corp., Burbank, Calif., reported sales, earnings and backlog reached postwar heights during 1952. Sales rose to $438,120,000 — a considerable increase from $237,230,000 in 1951. Backlog has risen to approximately $2 billion.

In other news from the company, Lockheed has established a leadership fund to finance 20 four-year college scholarships, in a national program to attract students into engineering and industry.

Builds Control Plant

Minneapolis-Honeywell Regulator Co. started construction of a west coast plant at Gardena, Calif., for manufacture of automatic controls for water heaters, floor furnaces, wall heaters and central heating plants.

The first unit, a machine shop, is scheduled for completion next June. Employment is expected to reach 2000 persons.

Air Products Builds Generator

Air Products Inc. will build a liquid-oxygen generator 60 feet high at its Emmaus, Pa., factory. The unit will be used by Grace Chemical Co.'s planned ammonia and urea-fertilizer plant in Woodstock, Tenn.

Using only air as a raw material, the generator will produce more than 200 tons of oxygen and 300 tons of nitrogen daily. It will cost about $1 million.

With the high-pressure oxygen equipment, Grace Chemical will produce ammonia by a new, low-cost process for partial oxidation of natural gas.

Here is perfection!

ROEBLING makes the finest high carbon wire available to industry today. Roebling wire is absolutely true to specifications . . . absolutely uniform in gauge and finish. Manufacturers who try Roebling wire once, become Roebling customers from then on.

You *pay* for the best when you buy high carbon wire. Make sure that you *get* it! Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

The Jonker, world's largest emerald-cut diamond.

ROEBLING

A subsidiary of The Colorado Fuel and Iron Corporation

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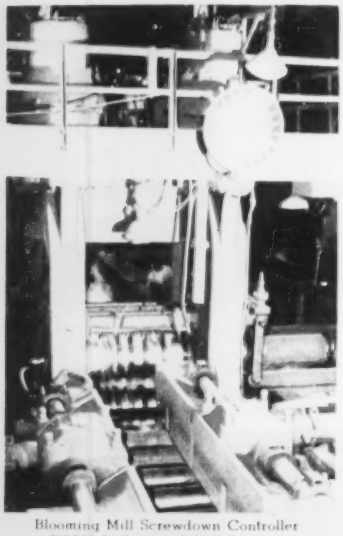
Control room in large steel plant showing EC&M TAB-WELD Resistors used with mill controllers.

...and not one cent for maintenance



Blooming Mill Screwdown Controller — EC&M Bulletin 925 Mill Type with LINE ARC Controllers and TIME CURRENT Relays — famous for low upkeep, too.

Throughout this large steel mill, thousands of EC&M TAB-WELD Resistors have been giving trouble-free service on hard-worked, heavy duty applications. Not one cent has been spent for maintenance — NO BURNING.

When an accident smashed the end-frames and spacers of two sections, there was NO LOSS in production. Even under the damaged condition, the circuit remained intact due to TAB-WELD'S all-welded construction.

Also important are the many taps which make on-the-job connections or adjustments easy. And, too, these resistors are corrosion-resistant.

For topmost performance specify EC&M Bulletin 942 TAB-WELD Resistors.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Production AND Engineering NEWS AT A GLANCE

ALLOY PLATE—A new zinc-iron alloy electroplate looks promising as a bright corrosion resistant coating for steel and may even be used as a substitute for nickel prior to chromium plating. British Iron & Steel Research Association reports that a coating of 5 per cent zinc and 95 per cent iron is hard, nearly mirror bright and has good adherence to steel. Alloy coatings with more zinc have better corrosion resistance but are not as bright. An electroplate of one-third zinc two-thirds iron is silvery in color and the corrosion resistance is comparable to galvanized coatings.

TREAT MAGNESIUM—A new chemical treatment for magnesium produces a complex chromium chromate on the surface which is highly resistant to corrosion. Developed by Allied Research Products Inc., the protective finish is dark brown in color and will not chip, flake or peel when bent since the coating is an integral part of the metal itself, rather than a superimposed film. The coating is formed by simple immersion of parts in a water solution at room temperature.

ELUSIVE FACTORS—One of the hardest factors of machining to pin down is that of cutting fluids. In almost all cases, some kind of a fluid will improve the machining operation, lengthen tool life and improve both quality and quantity of machine output. Many variables, however, cloud the picture and make it tough to tell just which fluid property or properties are needed for any one operation. Although these properties are not independent they can be separately recognized and studied. An example of improvements accruing out of proper application is the gain in a drilling operation when the fluid is applied through the drill to the point of contact. There are more, too. p. 106

PROOF POSITIVE—When a machine tool salesman ran into a skeptical client recently, he had to figure a way to prove the ways of the machine were hard enough to resist abrasion. He got a small sample of the way material, ground it into a cutting tool form and put it in a lathe. Result: The way-tool cut chips and the machine was sold. Don't cut up your machine for tools, though. It's still cheaper to buy standard cutters.

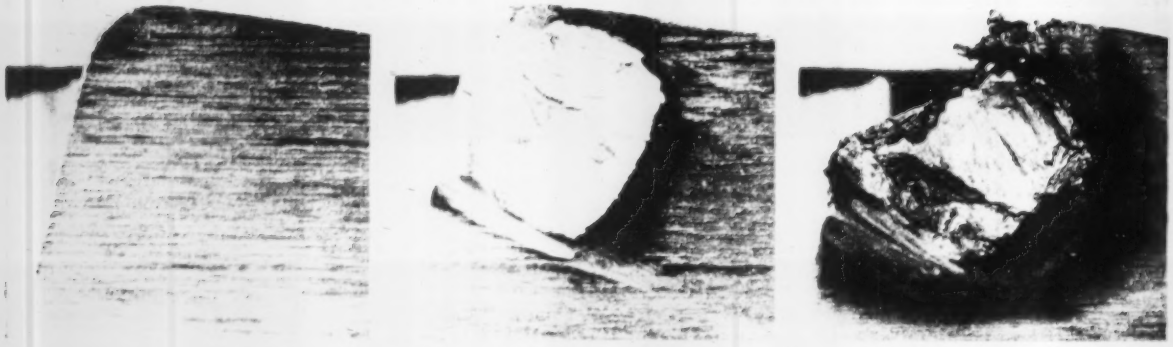
STEADY WORKER—Round-the-clock operations of a Baird Associates spectrometer play an important role in the steelmaking process at Weirton Steel Co. The work load consists of samples from 13 open-hearth furnaces and three blast furnaces along with the billet, mill and metallurgical samples. About 800 determinations per day are handled by one operator with help from a second man about one-third the time. Preliminary samples are taken from the molten bath in the open hearths from 1 to 3 hours before tap time and sent to the laboratory by pneumatic tube system. This procedure allows the melter to determine whether the melt will meet analytical specifications. Ladle samples at pouring insure a proper finished analysis. Time savings of about one hour per heat allow preliminary samples to be taken nearer tap time and assure that these samples are more representative of the melt. No delays are experienced by melt shop or rolling mills from lack of analysis. Savings in laboratory costs are estimated at $13,800 per year.

HERE TO STAY—Originally application of ceramic coatings on alloy steel parts was thought of as a measure to save critical metals. Many of these uses are now so well established and proved in service that they will continue after shortages are alleviated. The fact that lesser alloys or even carbon steels protected with ceramic coatings can match or exceed the performance of the highest priced alloys has obvious economic advantages. Mass production techniques are being applied to the coating process bringing costs down and making it possible for volume producers to be assured of an adequate supply. p. 110

BATTERY LONGEVITY—Constant improvement by the battery makers has raised the life of industrial storage batteries from an average of 24 months in 1923 to the present 72 months. Current development work is expected to add another 10 to 20 per cent to battery life. Included in the overall program are improved maintenance procedures as well as a better product. Despite the strides made in longer battery life, claims advanced for additives are discounted by most of the battery makers.

SAVING ZINC—Each year the wire galvanizing industry incurs a considerable loss because of oxide and dross formation. This problem has long been recognized and various methods used to combat it. A liquid blanket utilizing regenerative crystals that tend to maintain its fluidity has numerous advantages. These include: Lower dross formation, virtual elimination of noxious oxide fumes, reduction of prefluxing costs, reduced heat losses and increased production of galvanized work per ton of zinc available in workhouse stocks. p. 138

PROBLEM IN MINIATURE—Diminutive parts used in some manufacturing processes sometimes are production bottlenecks just because of their size. Good example is the application of small screws—you can put 2000 of them in a teaspoon—used in eyewear frames. At the Shuron Optical Co. plant in Rochester, N. Y., these screws are being handled automatically by a new power screwdriver with a blade about as thick as four human hairs.



Progressive failure of a single-point lathe tool operating under heavy-duty conditions. Advance is from new tool, at left, through the typical crater on the rake surface to the disintegrated point of the failed tool

Cutting Fluids:

THEIR ROLE IN MACHINING

Study shows how the four basic properties of a cutting fluid affect tool failure due to heat, wear and welding. Effect on surface finish is also studied

MAJOR PROPERTIES of a cutting fluid from the viewpoint of cutting performance are its ability to flow to the cutting area, to wet the metal, to remove heat and to reduce friction.

Practical results of concern to engineers, such as tool life and surface finish, are products of mechanisms which are affected by both cutting fluid properties and operating variables. It is important to establish the links, fluid property-mechanism-result, so that in any particular case, attention can be given to those properties which control the dominant mechanism for that particular set of operating conditions.

For example, in a drilling operation where drill margin pickup leads to seizure, tool life might best be improved by the use of anti-welding additives in oil. On the other hand, in a high-speed, medium cut lathe operation, maximum tool life might require the excellent cooling properties of water.

Overlapping Effects — The fluid properties are not independent of each other and their effects also often overlap. However they can be separately recognized and in many cases modified. Flowing to the area of cutting action, depends largely on the viscosity of the fluid. The wetting property will determine the degree to which the fluid directly contacts metal surfaces and is primarily important under adverse conditions of pressure and temperature, where insufficient wetting will lead to squeezing out of the fluid.

Inherently then, cooling under such conditions will also depend on the wetting property. This is also the case where the coolant cannot be directed straight on to the cut, but must spread to that area along the metal surface. In the absence of sufficient flow and wetting, a relocation of the coolant jets to bring the fluid to the critical tool areas can sometimes effect a significant increase in tool life. Cooling, in the sense of heat removal, depends on the specific heat of the fluid, boiling temperature and heat of evaporation.

Surface Breakdown—Practically all machining operations produce conditions which preclude thick film lubrication. Under the resulting boundary conditions viscosity is a minor factor, and oiliness a large one.

Under extreme conditions, when even this regime can no longer carry the load, and welding would result, extreme pressure agents can be used which according to the best available theories react with the metal surfaces to form an easily sheared surface layer. The effect thus also is one of reducing friction, but while ordinary boundary lubrication interposes some kind of thin film between the rubbing surfaces and thus protects the surfaces against attrition, EP agents by their very action, which is usually called corrosive, destroy the metal surface.

Group Reaction—These then are the major fluid properties of significance in metal cutting. In an actual cutting operation they are not always readily distinguished.

Based on a paper by S. J. Arnubien and A. G. Cattaneo, Shell Development Co., Emeryville, Calif., presented at the Conference on Metal Cutting, Massachusetts Institute of Technology.

If, for example, in a particular operation a change in fluid produces a lower tool point temperature, then an improvement in any one of the properties might have been responsible. In such a case an analysis of the cutting mechanism, or one of the fluid properties, or both, will indicate the property responsible.

Base Fluids Described—Water is an excellent coolant by virtue of high specific heat (which is reduced by practically any type of additive) low boiling point and high heat of evaporation. Its viscosity is very low, and thus it flows readily to the desired point.

Water also wets clean steel well, and its wetting properties towards steels which are not clean are readily enhanced by the addition of soaps. It is exceedingly poor as a lubricant under boundary conditions, and although this property can be improved by additives, in current practice water most often is combined with mineral oil as a so-called soluble oil.

Friction Reducers—Mineral oils cover a wide range of viscosities, all much higher than that of water. It is therefore more difficult to get them to the scene of the cutting action. They wet steel as well as water when it is clean, and much better when it is not. Their cooling property is very inferior to that of water. Ability of mineral oils to reduce friction under boundary conditions is outstanding, and can be further enhanced by the addition of fatty acids or other oil soluble compounds containing polar groups. With EP agents, usually oil soluble compounds containing chlorine or sulphur, the severity of the conditions under which they maintain low friction can be further extended.

Tool Life

Excess Heat—Tool failure caused by the sudden shearing away of the tool point usually is preceded by the reduction of some critical tool cross-section, such as cratering in a lathe tool, which weakens the tool structurally and raises the point temperature by creating a heat dam.

Alternately, the same type of failure may occur after gradual tool wear has rearranged the forces so that excessive heat is generated at the tool point, melting the tool.

Keep Cool—In this type of failure cooling will accomplish large improvements in tool life. When various fluids are compared, the dominant effect of cooling is evident. Changes in viscosity of the oil had no effect.

However, in some metalcutting processes such as a severe drilling operation, even for conditions where this type of tool failure controls tool life, coolants are not effective because they can't reach the tool point in sufficient volume.

To the Point—Addition of a wetting agent to water can increase the drill life threefold. Even more effective is the use of a hollow drill to deliver water directly to the drill point. A 15 to 20-fold increase in drill life can be obtained in this way.

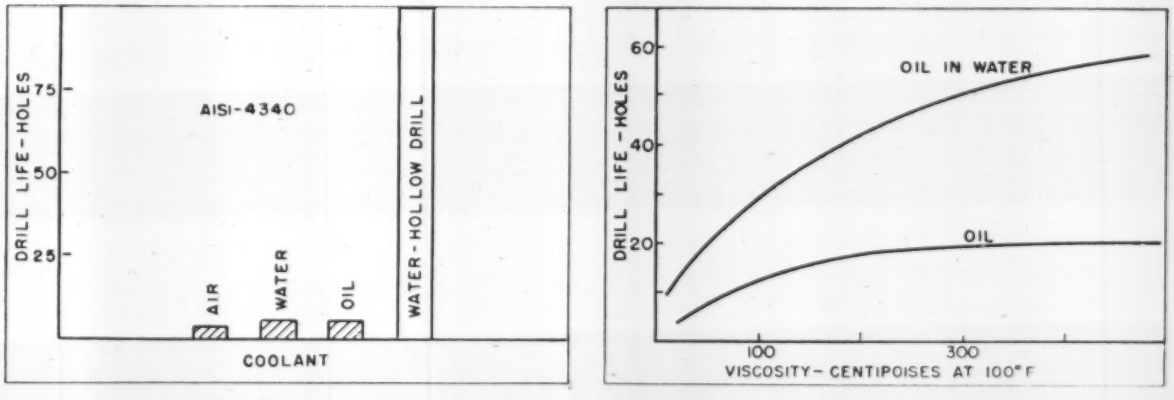
When EP agents are added to a mineral oil, this kind of tool life is increased a small but significant amount. Other variations in friction-reducing property of the fluid have no effect.

Second Glance—When the coefficient of friction between the chip and the tool is computed from dynamometer data for an uncompounded oil and one containing an EP agent it might seem that the reduced friction would mean less heat generated at the chip and tool interface.

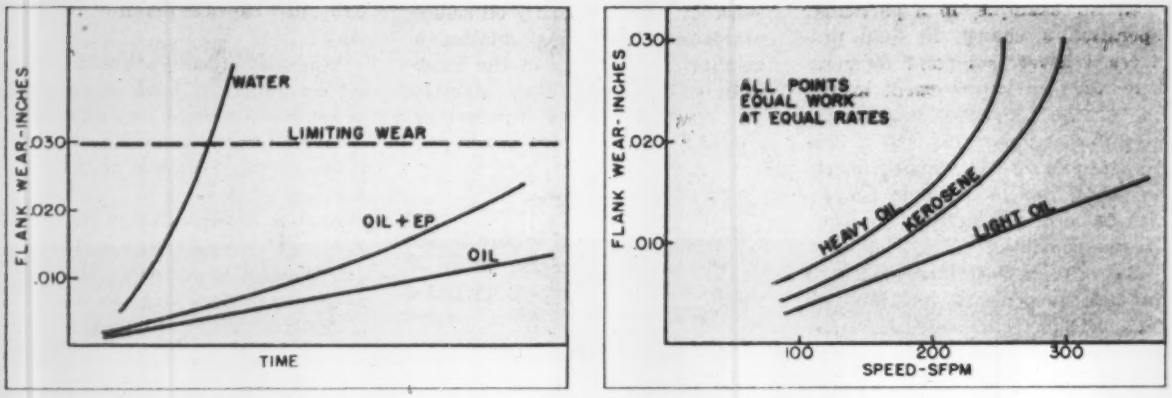
However, when the friction work and the shear work are computed the reduction in the coefficient of friction by the use of the EP agent has only a negligible effect on friction work and almost the entire advantage appears as a reduction in shear work.

External Is Best—Result of reduced shear work is a cooler tool point. However there is less advantage in this respect than if friction work had been reduced, because of the concentration of energy at the tool-chip interface for the latter case. Even so, this mechanism results in increased tool life for those applications where the tool normally fails from excess heat. However it does not compare in this respect to adequate external cooling.

For example, under conditions giving a 60-minute tool life in lathe turning of AISI 4340 steel with water, oil had about a 10-minute life and oil plus EP agents had about



Graphs show effect of cooling, left, and viscosity on drill life. For test ⅜-inch drill was used at 1240 rpm, 0.006-inch feed per revolution and 1-inch depth. Note gain when fluid goes through drill to the point



Effects of lubrication, left, and viscosity on tool wear in lathe turning. In both cases AISI 1020 steel was used for the test runs with HSS tools

a 15-minute life. Adding a wetting agent to the water gave no improvement over the result with water alone, indicating that in this case, as in most lathe turning, an adequate supply of coolant was already reaching the tool point.

Short Life by Wear—Second kind of tool failure is one in which the tool gradually wears to a degree such that dimensional or surface finish tolerances cannot be met, or tool load is excessive, or the limit for economic salvaging of the tool is reached. In all cases this failure results from a gradual change in tool dimensions, usually with no sudden change in the quality of the product produced.

Under these conditions reduction of friction appears to be the most important property of the fluid and oil is far superior to water. Addition of an EP agent has only a small effect, sometimes beneficial, but more often it produces faster wear, attributable to the corrosive action of the additive.

Like Water—One might expect that oil in water emulsions would give results falling between each of the components. However, at water dilutions and with oil viscosities commonly used, the results are not significantly different from water alone. An exception to this occurs with the newer heavy duty emulsions containing EP agents; with these fluids the performance may approach that obtained with EP agents in oil.

With wear-limited tool life, viscosity is important. In a drilling operation for example, oil viscosity can modify tool life by about a factor of three; this is true whether the oil is used neat or in oil-and-water emulsions.

Viscosity Important—For lathe cutting at moderate metal-removal rates where wear controls failure, there is also an advantage for increasing viscosity, but mechanical factors may limit the use of this fact. When a light mineral oil was compared to a kerosene fraction and to a heavier oil the light mineral oil was consistently best and showed the greatest advantage at high speed.

Results undoubtedly depend upon test conditions, and will vary with tooling and procedure changes. Apparently in this work the heavy oil was too viscous to flow adequately to critical wear areas, especially at high speed. Both kerosene and light oil gave tool protection but since the more viscous material was best, it seems that viscosity is important for this kind of tool life, probably through a reduction of the metal to metal contact, or friction.

Cooling has no significant effect on this type of tool failure. It does not appreciably affect the wear rate of a moderately loaded tool.

Weld Effect—Third kind of tool failure results from welding of workpiece material to the tool. In many instances this process may be desired to some degree. An example is the built-up edge on a lathe tool. In drilling or reaming, however, pickup on the tool may seriously limit its further use.

EP agents in oil have a pronounced effect on this mechanism, often increasing tool life by as much as 10 or 20-fold. Cooling with water alone has a lesser but appreciable effect in some applications, and oil alone has no significant effect.

Double Action—At this point the effects should be considered of EP agents on tools which fail by the sequence of wear and welding. Severe drilling, at about four diameters deep in a steel like annealed AISI 4340, provides an interesting example.

Failure occurs through the following chain of events: Wear occurs on the cutting edge near the periphery where the surface speed is highest; as the drill advances into the resulting tapering hole the drill margin clearance is reduced to zero and the friction in this highly loaded area causes welding of the drill margin to the workpiece. For this application, when oil alone was compared with EP agents in oil it was found that corner wear was less for oil alone. However, a fluid of EP agents in oil is so much better able to tolerate high load resulting from wear that ultimate tool failure from seizure is postponed and drill life prolonged greatly.

Surface Finish

Somewhat less clearly defined, but nevertheless exhibiting distinct differences, are the processes governing relationships between fluid properties and surface finish.

Single Contact Cutting—Largely of academic interest, but practiced to a limited extent with some tools, is the surface finish produced by a

single contact of the tool. In the laboratory this is accomplished by cutting a continuous chip on the end of a tube; in practice, a roughing broach is an example.

Cooling seems to have a slight negative effect on surface finish in this type application. For some operating conditions, dry, mineral oil, and water, were found to give slightly increasing roughness in that order. Apparently the chip is sheared more cleanly from the workpiece when the chip and tool are at higher temperatures. When the surface is reworked by the tool this small advantage is lost.

Neither oil alone, nor EP agents in oil had any significant effect. Oil viscosity was not evaluated.

Multiple Contact Cutting — In most practical applications the major cutting edge of the tool generates an endless transient surface, the chip, which is discarded. The finished workpiece surface is formed by successive passes of the tool point as it is fed across the work. In simplest terms, most practical metal cutting shears the chip from the work and then smooths and burnishes the surface by subsequent passes of the tool.

Effect of cooling is usually negligible. In lathe cutting for example, cutting dry, with water, or with mineral oil gave about the same finish throughout a range of speeds. The question of changed lubricity does not appear to enter here since the coefficient of friction is the same for each fluid at any given speed in this application.

Field for EP—Oil alone has little effect on surface finish. However, EP agents in oil are quite effective for improving finish in the reworked surface processes.

Although much work has been done on control of mobility of the built-up edge with EP agents, and the subsequent effect on surface finish, these data together with the negligible effect found in single contact cutting, suggest that EP agents are most useful when they enhance the reworking and burnishing action of the tool. They probably function by preventing surface irregularities and portions of built-up edge which have escaped onto the workpiece, from rewelding to the tool and being plucked from the surface.

In the Tight Spots — Since the primary effect of wetting agents is increased cooling, and since cooling alone has little direct effect on surface finish in the usual applications, normally wetting agents do not influence surface finish. Exceptions are found in applications with restricted cooling which cannot tolerate tool pickup without loss of surface quality.

Drilling and boring are common examples of these applications, while a wide plunge cut on a lathe represents a less common but just as susceptible a process. The latter cut is usually inadequately cooled because the fluid is diverted from the tool point by the chip and the dam created by both sides.

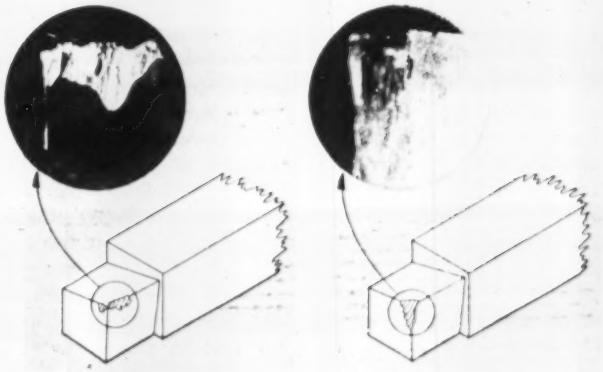
Thread Cutting — No general physical differences between the conditions for thread cutting with dies and those for general multiple contact cutting are apparent, except that the small diameter thread ($\frac{1}{2}$-inch) studied here, together with the use of a four chaser die, permitted only a short time interval between tool contacts at reasonable surface speeds.

Nevertheless, in thread cutting with dies, cooling has a decided beneficial effect on surface finish while it has none in multiple contact cutting. This discrepancy is so pronounced that this operation is probably particularly sensitive to pickup, and it is the reduction of pickup through cooling which accounts for excellent thread finish. EP agents also produce a fine finish in this operation.

Tool Forces

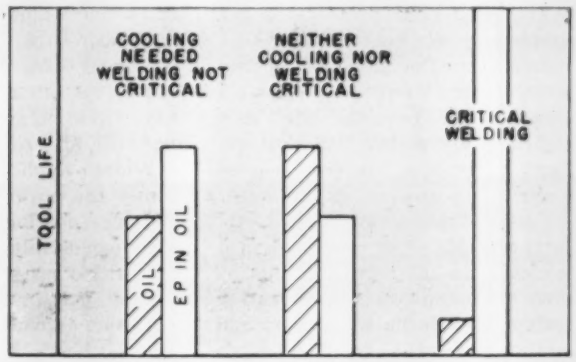
No significant effect of cooling on the magnitude of the resultant tool force has been found. One might at first think that cutting dry would raise the temperature sufficiently to lower the shear strength of the metal in the shear plane. If the shear strength is calculated from dynamometer and cutting ratio data, it is found that dry, water, and mineral oil, have no effect.

Oil alone has only a little effect on tool forces. However, EP agents in oil reduce the total tool load by as much as 40 per cent. In many cases this will not be of particular interest to the user since power cost is usually not important and machines are designed to tolerate high loads. However, some machines, such as drill presses, are frequently torque limited, and the reduction in torque possible with EP agents permits a significant increase in machine productivity.



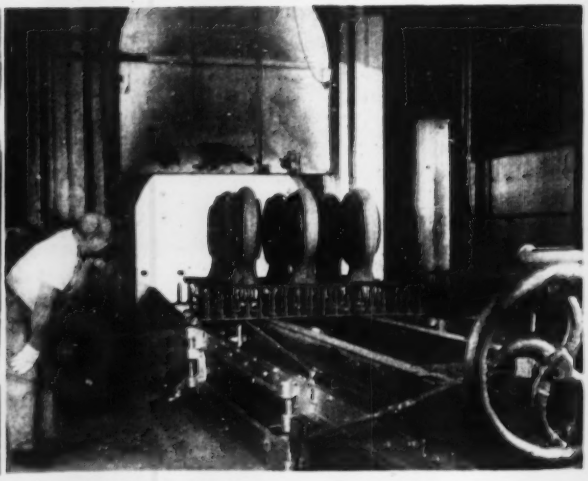
Drawing and inset show nature of tool failure by gradual wearing of flank surface on single-point lathe tool

Failure of a single-point lathe tool by sudden shearing of the hot point under heavy-duty operating conditions



Bar chart shows typical effects of EP agents on tool life limited by cooling, wear and welding of work to tool

Internal surfaces that cannot be sprayed are coated by squirting mixture inside, rotating part and draining



A batch of nozzle boxes is shown moving into firing furnaces where 0.001-inch coating will be fused to metal

Ceramic Coatings Boost Alloy Steel Use

What started out to be an emergency measure to save critical metals is gaining more applications in the field of permanently finished metals. Mass production is helping

By FRED D. SHAW
Vice President
Bettinger Corp.
Waltham, Mass.

SUCCESSFUL development of mass production facilities devoted exclusively to high temperature ceramic coatings of metal parts establishes a vast new potential for the use of high alloy steels in our industrial economy. Developed to meet critical metal shortages, these coatings also hold promise of reducing costs through lower maintenance and longer life.

Short supplies of tungsten, cobalt, columbium, molybdenum and nickel posed great problems in the production of high temperature metals for engine parts and special performance equipment. Many items which required the very highest alloy metals can now get equal or greater life from coated lesser alloys or even carbon steels.

Future Tremendous—In all production fields using metals subject to oxidation and corrosion alone—such as automobile parts, heating systems and furnaces, civilian and military aircraft engines and parts—the future of high temperature ceramic coatings is tremendous. Cost of maintenance of nonpermanently finished metals used for industrial, domestic and other purposes is great when one considers replacement, labor costs, and losses due to the immobilization of valuable equipment for varying lengths of time.

Aside from saving critical metals, one of the greatest advantages of high temperature ceramic coating is the extension of life of the metal part. Life expectancy of coated steel parts is from two to three times that of uncoated parts in temperatures in excess of 1500° F. Under somewhat lower temperature conditions, these coatings have shown a tendency to prolong part life almost indefinitely.

Wider Applications — Until recently the advantage of high temperature coatings has been available exclusively to high priority, specialized production, such as jet engine parts. Recent production has been extended to nozzle boxes, exhaust hoods, collector rings, cooling caps, exhaust manifolds, diffuser cones, combustion chambers, nose heaters, heat exchangers, flame holders, furnace mufflers and heat treating equipment.

Today the modern high temperature ceramic coating plant is prepared to extend production to all industry. Facilities at Bettinger, for instance, make it possible to apply any type of ceramic coating to virtually any metal alloy requiring protection. An experimental and development laboratory is available to manufacturers for testing application of the ceramic coating for new and specialized uses.

Cleaning Bottleneck — Perhaps the greatest bottleneck in the early stages of development was the preparation of the metal itself before application of the coating. Early General Electric Co. experiments on metal preparation showed that sandblasting had to be combined with complicated pickling before high temperature ceramic coatings would adhere satisfactorily to metals. Each piece must go through various acids and rinses many times, alternated with cold water pressure rinses. When absolutely clean, low-pressure sand-

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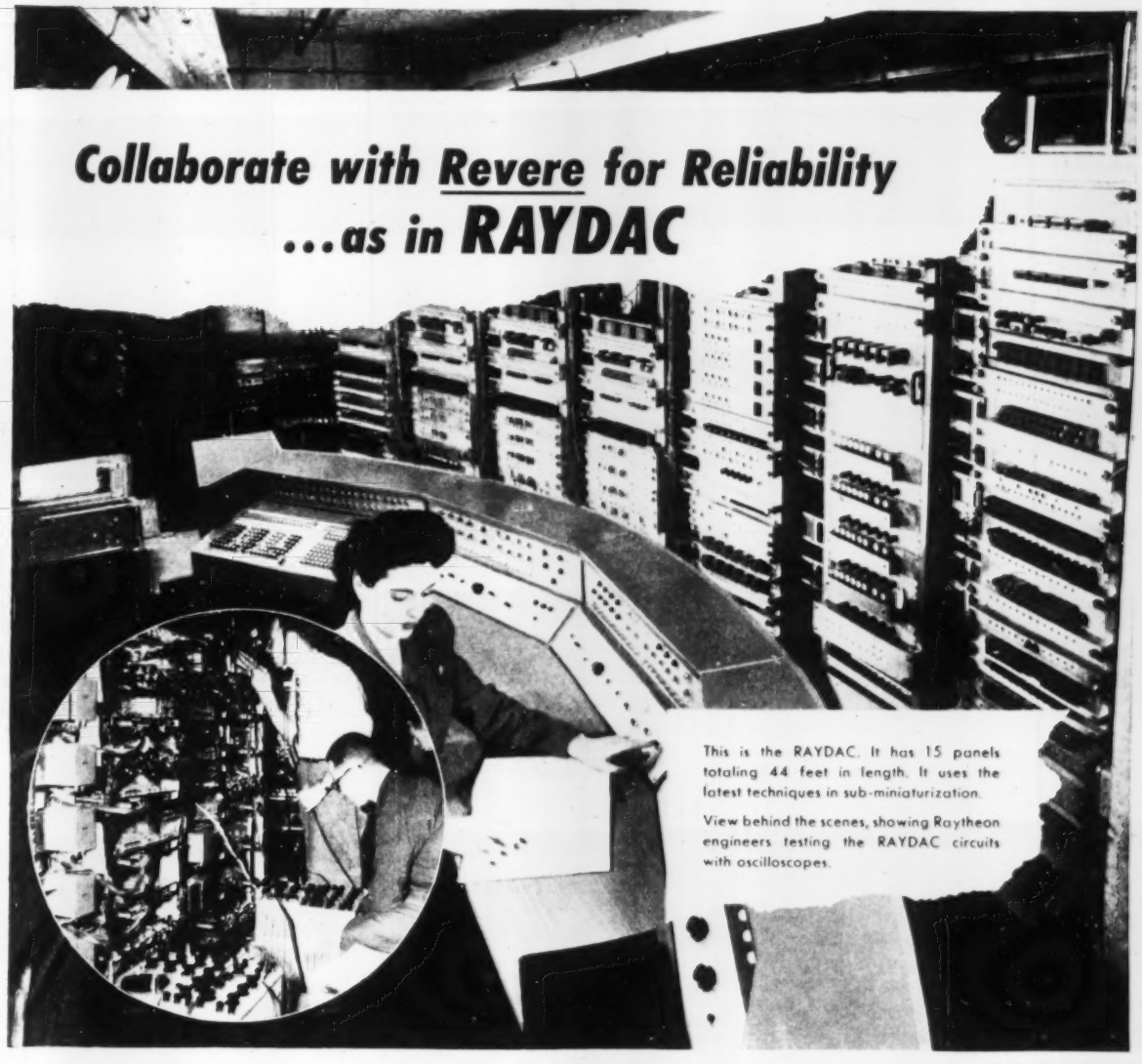

This is the RAYDAC. It has 15 panels totaling 44 feet in length. It uses the latest techniques in sub-miniaturization.

View behind the scenes, showing Raytheon engineers testing the RAYDAC circuits with oscilloscopes.

RAYDAC means Raytheon Digital Automatic Computer, developed by the Raytheon Manufacturing Company, Waltham, Mass., for the Navy's Bureau of Aeronautics. It is an "intelligence center" to help analyze the behavior of missiles during test flights. Its importance is indicated by the fact that in a matter of minutes it can perform the calculations involved in analyzing a single missile flight, a task that would take a team of mathematicians from 20 to 30 days. The Raydac thus speeds up tremendously the development and testing of such missiles. It contains enough tubes and germanium diodes made by Raytheon, for more than 1,000 home radio sets.

In such a complicated electronic computer reliability is essential. This is achieved through design, the choice of the best materials and components, and meticulous manufacture. Revere during the past 10 years has collaborated closely with Raytheon, working out proper specifications for materials, as for example, OFHC copper. Raytheon engineers and production men have visited Revere laboratories at New Bedford, Mass., and Rome, N. Y., and many Revere specialists have studied methods and processes in the Raytheon plants and laboratories. These hand-in-glove contacts, many of them highly confidential, have proved their value.

The same kind of collaboration is open to you, and will be especially useful and time-saving if begun as soon as you have a new project on your boards. To obtain it, simply get in touch with the nearest Revere Sales Office. See your telephone book or write direct.

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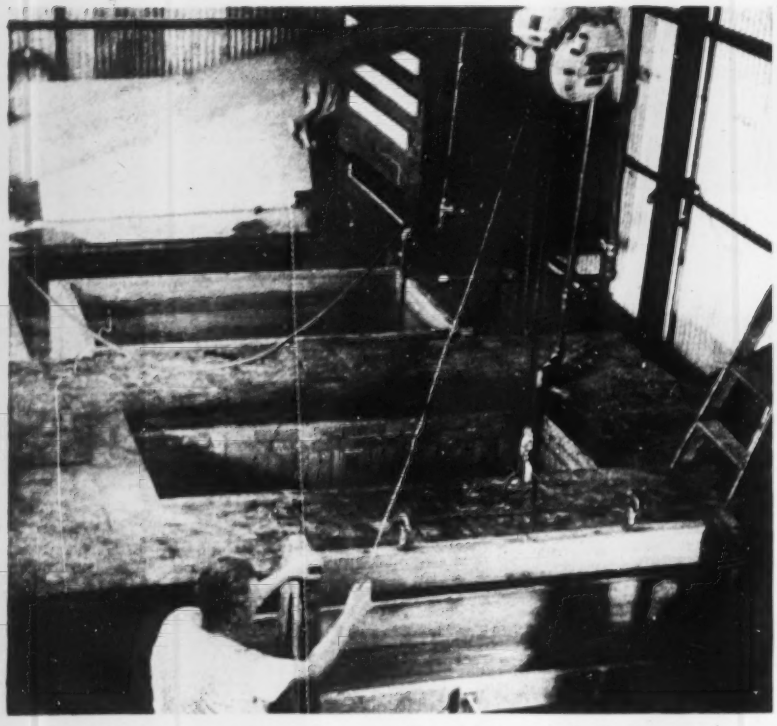


Tanks built for high temperature pickling process at Bettinger. Alternate acid dips and cold water sprays remove scale before final blast cleaning

blasting renders the smoothest possible surface.

Because the conventional pickling equipment is useless for the necessarily high-volatile acids, special carbon brick tanks have been constructed to hold the concentrated nitric and hydroflouric acids in hot solution for the initial cleaning. Cypress wood is used for flues, shrouds and rinse tanks to be sure that there is no metal for the acid fumes to attack. Special drying and rotating draining systems were also devised and built.

Selecting the Coating — Three points must be considered in the choice of proper coating material. First, the degree of protection needed in terms of operating temperature, operational stress, strength and life expectancy of the part. Second, the type of metal to be coated; and third, the conditions of operation defined by heating cycle or motion of the part.

In the matter of the second point, for example, coatings on low-carbon steels must be fused early in the heating cycle to seal off oxygen and prevent too much oxidation of metal. For firing very high alloy metals, fusion has to be delayed until sufficient metal oxide is formed to guarantee adhesion.

Experimental development has proved that two general classes of ceramic coatings are most suitable for common use. One of these is the Solaramic and A-418 series, used for coating 300-400 series stainless steels as well as the higher nickel alloys such as Inconel. Other class is the A-19 series used for coating lower grade alloys.

Composition and Consistency — High temperature ceramic coatings are usually only a 0.001-inch thickness of refractory ingredients fused (at 1875° F) to the surface of the part to be protected. Material itself is a mixture of frit (small pieces of glass), clay, high temperature metal oxides and other substances. Composition and consistency varies according to special requirements, and both must be carefully controlled.

The capacities of these coatings have been discovered through controlled performance tests, specimen tests and experimental applications in extensive laboratory work. Test pieces have been heated rapidly from below freezing to 1875° F and plunged into cold water again and again to prove thermal shock resistance. Ability of coatings to take blade growth at high temperatures has been indicated by repeated trials with ceramic coated blades.

Gage Can Vary — Greatest problem of all is that in many given parts (such as a turbo-supercharger nozzle box) there are several types of bases for the same ceramic coat — some heavy gage metal, some light gage metal, some coatings, some welded areas. When fired, the thin sections heat up more quickly than the thick sections, the castings at a different rate than the sheet metal.

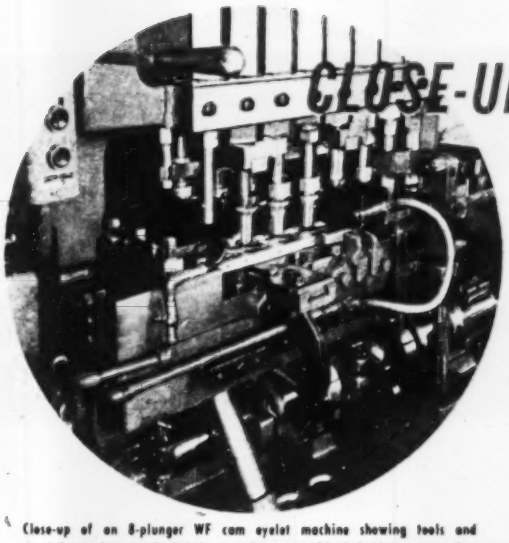
Metal preparation and the firing of the coating on such a piece must be very exacting. To insure a surface so uniform in finish that a coating will fuse equally well on all sections of the piece is the main problem in this type of process.

Time Is Consistent—Processing time for high alloy steel part on the new mass production scale proved to be well in line with the pace of other large-scale modern production techniques. While time may vary, parts which enter the plant for coating go through a standardized production routine which includes scaling, pickling, firing of coating and overall final inspection.

During the processing, continual inspection of parts and of coating composition is based on visual standards and experience gained during experimental development. Parts are subjected to repeated spot checking for thermal and mechanical shock. Final inspection is done with gages and instruments. If any part is unsatisfactory, it can be reworked by stripping the ceramic and reprocessing. Only one rework is allowed, however, since recycling might harm the metal base.

Field Repairs? — There is good indication that ceramic coatings can be repaired in the field. This would apply, of course, only to small spots with signs of wear or damage. In the near future, it is anticipated that it will be possible to clean a part locally and then apply a healing coating by spraying or torch firing.

Each day new possibilities are suggested and new uses of the process will continue to be developed for industry.



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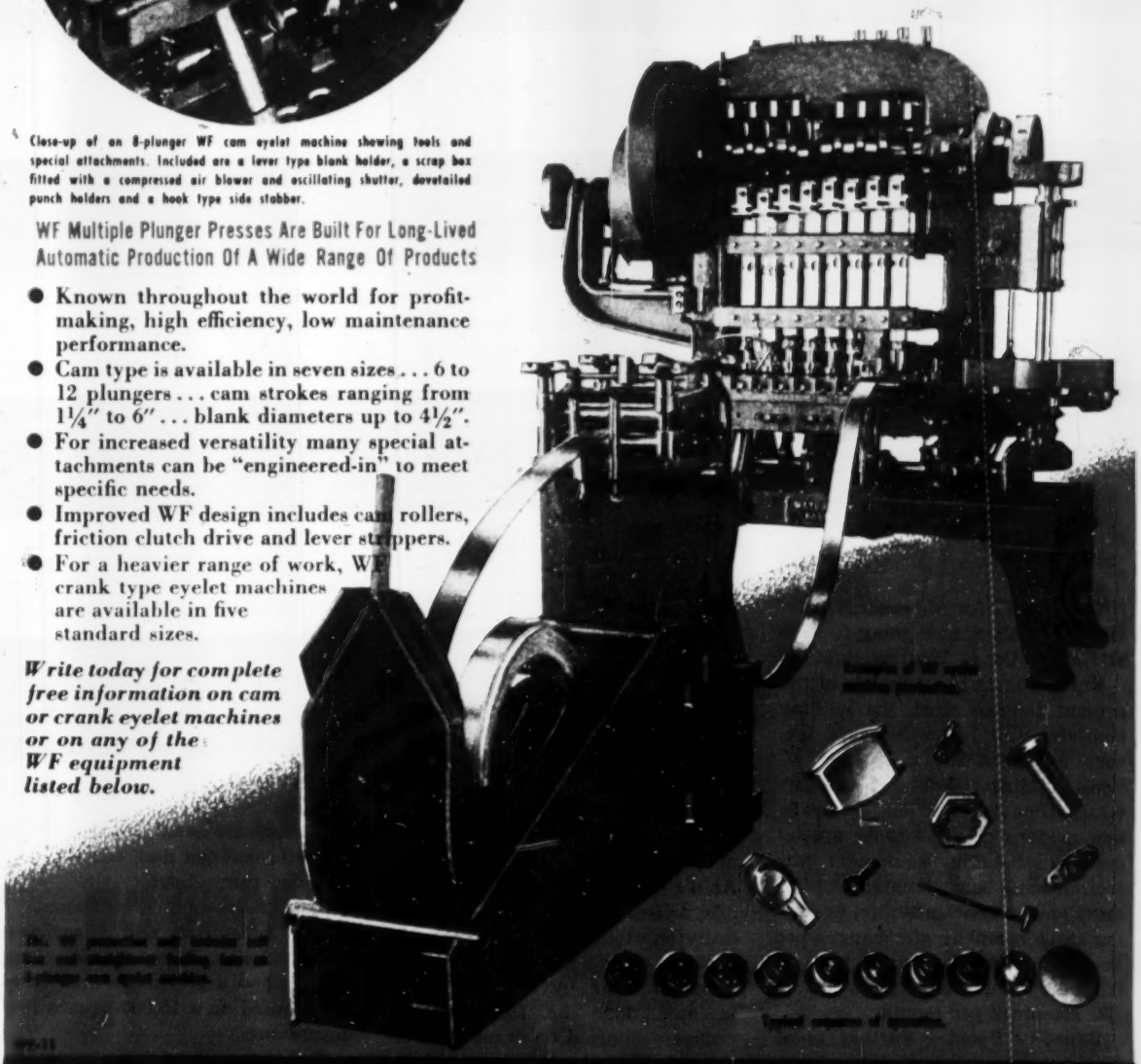

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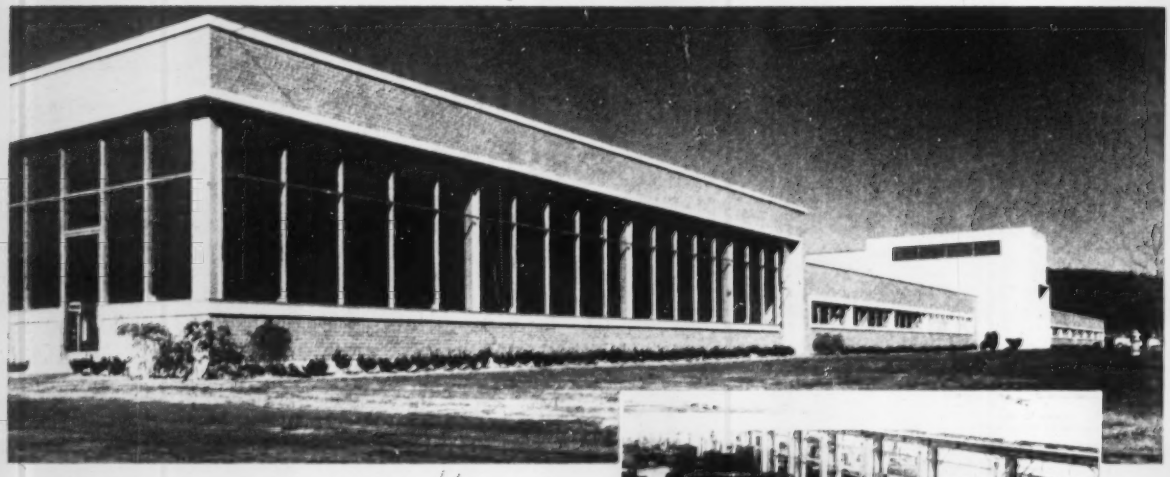


Cafeteria in foreground seats 386 people at one sitting. Entrance is at center of plant. At right, craneways are supported independently

Machine Tool Plant Features Inline Production Layout

Organized flow of parts in process will cut handling distances by 50 to 90 per cent. Ease of maintenance is another factor

NEW PLANT for the production of machine tools is now going full tilt at Norton Co. in Worcester, Mass.

Built to meet the demands of the present defense effort, the building consists of a 740 x 300-foot factory joining a 360 x 100-foot office building. Features include straightline production methods, new modern machine tools, special materials handling equipment, air-recirculating dust control equipment and forced ventilation providing three complete air changes per hour. Cost of the plant was $6 million. Estimated top output is 150 machines per month.

Capacity Boost — Factory is of single-story construction providing 275,000 square feet of working space. It adds about 50 per cent to the company's machine-tool manufacturing capacity.

Supplies and raw stock come in at one end of the plant and progress through the five 60-foot bays toward the final assembly floor and shipping area. Typical examples of the savings in handling are:

Travel cut from 3140 to 554 feet for a heavy grinding machine wheel slide and from 4900 to 896 feet for wheel spindles. It is estimated that over-all handling distances have been reduced 50 to 90 per cent.

Better Delivery — Straightline production simplifies the problem of quality control and expediting. As a result of more efficient methods, delivery dates may be substantially shortened.

Much of the materials handling formerly done by electric trucks is now done by floor-operated cranes supported on craneways independent of the building.

There are several receiving and shipping platforms accessible to motor trucks.

Housekeeper's Dream—Construction of the building shows that planners had efficient upkeep in mind. Practically no painting will be required to preserve the outside surfaces. Walls are cinder block faced with brick. Aluminum window sash, galvanized steel exposed metal parts and Transite siding make up remainder of the exposed siding. The roof is of tar and gravel.

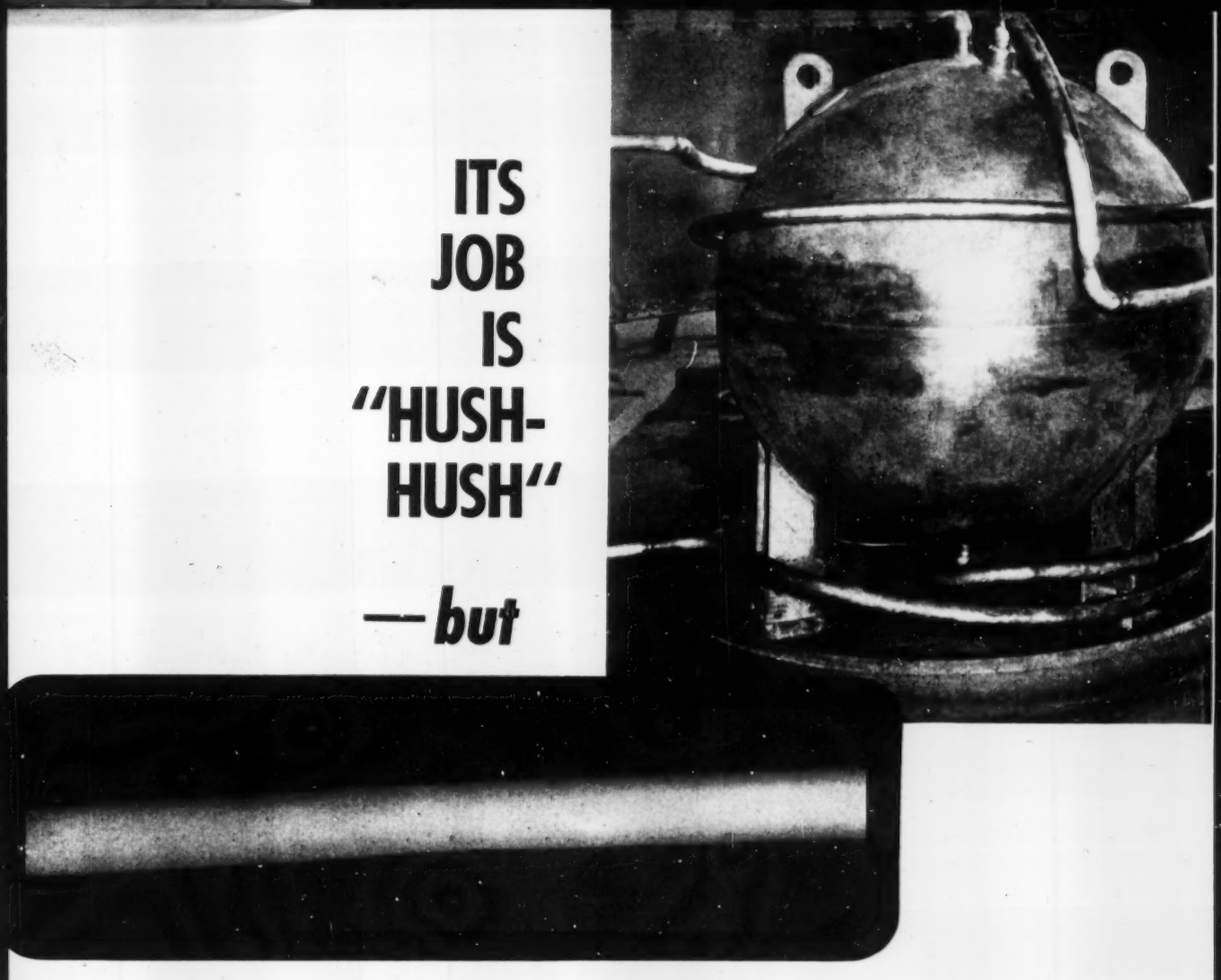
Inside construction is likewise designed for a minimum of upkeep. Office spaces are equipped with acoustic ceilings and are air conditioned throughout.

Locker rooms, washrooms, a power substation and miscellaneous spaces such as stores, classrooms, and a foremen's club room are housed on a 15,000-square foot mezzanine.

Power consumption approximates 2000 kw per hour. All steam, electricity, and telephone service is supplied from the main plant, about a half mile away. Current employment in the grinding machine division is about 1500, 400 more than were employed prior to the expansion.

ITS JOB IS "HUSH-HUSH"

—but



RADIOGRAPHY makes its welds an open book

FEW people might know what this vessel is for. But its makers and those who use it know it is strong and safe — especially at its vital girth seam.

For radiography made certain that this weld was sound — that no gas porosities, or lack of fusion lurked hidden to present hazards. X-ray inspection gave positive proof that all was well.

Because radiography provides such assurance, it has opened new fields for welders . . . has helped welding to win acceptance even in the manufacture of pressure vessels.

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X-ray Division—Rochester 4, N.Y.

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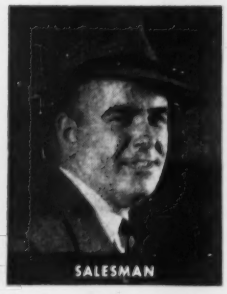
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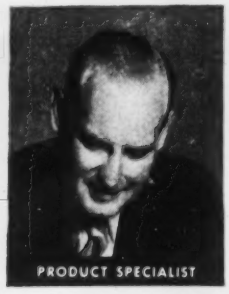
DISTRICT MANAGER

RECEPTIONIST

OFFICE MANAGER

CREDIT MANAGER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UNITED STATES STEEL

NEW PRODUCTS and equipment

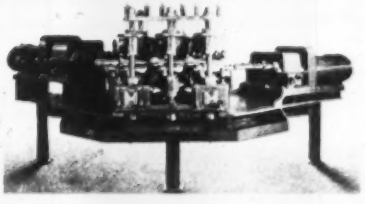
Reply card on page 121 will bring you more information on any new products and equipment in this issue

Improved Rotary Straightener

. . . has steel table mount

Improvements in this model AX tube and pipe rotary straightener place its two 3-hp motors and the drive spindles on a steel table mount. While bolt holes in table feet facilitate permanent installation on production lines, the complete unit can be relocated quickly as production requirements affect shop layouts. A circulating flood lubrication system for the straightener's six driven rolls is now an integral part of the machine design.

Petroleum-base liquid lubricant is directed at points where tube or pipe contact each pair of rolls. This dissolves the residue of solutions used in drawing operations,



washes away metal particles that might mar tube surface and lengthens roll life. As a safety measure, covers are provided for the six drive spindles. Mackintosh-Hemphill Co., Dept. ST, 901 Bingham St., Pittsburgh 3, Pa.

FOR MORE DATA—CIRCLE REPLY CARD NO. 1

High-Speed Fastener

. . . driven without a dolly

This fastener makes blind spots easy to handle, can be driven without a dolly at a rate up to 1200 per hour. Called the Pop rivet, it is available in Monel and aluminum. Deep drawn from strip stock, the rivets can be used to fasten most commercially available metals and alloys.

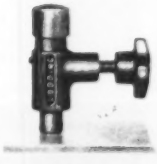
It consists of the rivet itself, and an inserted mandrel of high

strength steel. The mandrel with attached rivet, is slipped into either predrilled holes in the work to be fastened or into the fastening tool, then into the hole. Fastening tools can be operated manually or pneumatically. J. C. Rhodes & Co., Dept. ST, New Bedford, Mass.

FOR MORE DATA—CIRCLE REPLY CARD NO. 2

All-Purpose Spring Jack

. . . no need for specials



This standard spring jack is built as a versatile work support for materials or parts being machined. Usable in many ways, it makes design of special jacks for many jobs unnecessary. To operate, the spring-actuated plunger contacts the work without requiring manual pressure. After contact, the plunger is locked by the hand-operated screw.

A dust cap protects working mechanism against chips and dust. All parts are rustproofed. Unit is offered in two models, one with a button base, the other with a flange. Lodding Inc., Dept. ST, 79 Beacon St., Worcester 1, Mass.

FOR MORE DATA—CIRCLE REPLY CARD NO. 3

Drilling, Assembling Machine

. . . automatic hopper loading

This machine is designed for automatic drilling, assembling and crimping operations. It is built for automatic hopper loading of breather nut, insertion of baffle, crimping of baffle, drilling of nut and automatic ejection. In addition to manpower savings through automatic

operation, the unit is engineered to economize on floor space. Turner Bros. Inc., Dept. ST, 2625 Hilton Rd., Ferndale, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 4

Steel Framing Material

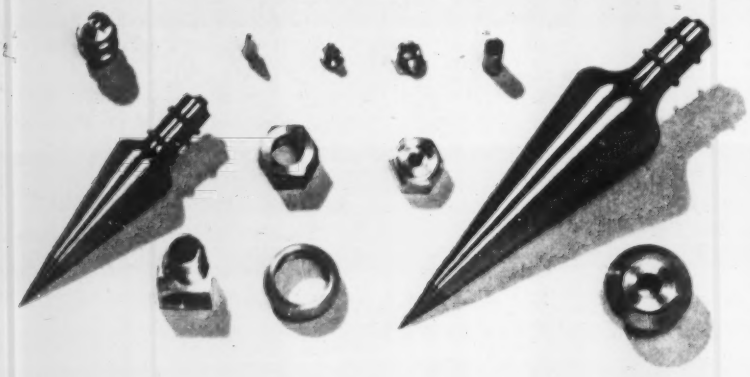
. . . no nailing, drilling, welding

Three basic units channel frames, spring-T-bolts and lock fittings comprise the parts of this steel framing setup. Called Mult-A-Frame, the material can be used to build equipment for present needs, but can be dismantled, adapted or converted without scraping. Frames are assembled for

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport Brass Co. MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL



High quality screw machine items made from free cutting brass rod. Courtesy Hershey Metal Products Inc., Derby, Conn.

Brass for Higher Quality Screw Machine Items

In periods of metal shortages there is often a switch to substitute materials. Yet, it must be remembered that brass, an alloy of copper and zinc in various proportions, has attained its position as first choice for screw machine items and countless other products because of its exceptionally fine properties and easy workability.

Brass, although an ancient metal, is also most modern because it continues to be used in the newest products of each age. Its enduring qualities are illustrated by the exquisite brass articles which are still in excellent preservation although made several thousand years ago. For example, Etruscan brasses made about 600 B.C. and the brasses found in religious structures in England, some of which date back to the 13th century, are practically as good as when originally wrought.

The brasses are the most valuable and widely employed of all non-ferrous alloys. Their high resistance to ordinary corrosive agents and the broad range of properties which are imparted to them by variations in the proportion of the constituents and in mechanical and heat treatments give them the very versatility which fits into every type of product and industry.

Brass is easily worked, drawn, formed and machined. In spite of its great strength and resistance to wear and abrasion, it is gentle with cutting and drawing tools made from steel.

Many Alloys Available

The addition of lead to brass greatly increases its cutting speed. Bridgeport Ledrite rod No. 6 contains about 61% copper, 3.4% lead and the remainder zinc. Its machinability rating is 100%. This alloy will take care of about 90 percent of requirements for free cutting brass rod. Its high machinability rating is appreciated when a large percentage of metal must be quickly removed on an automatic screw machine as exemplified by the plumb bobs shown in the illustration.

Free cutting brass rod is generally specified where great accuracy and close manufacturing tolerances are called for. Excellent machinability, low tool wear, and uniformity of product are also essential when it is necessary to mass produce screw machine parts with thin walls or when tiny holes or sharp threads are specified.

Where deep knurls are required and the standard Ledrite alloy No. 6 is not entirely suitable, the same alloy can be furnished in a softer temper which will permit deeper impressions to be rolled in. This can also be accomplished by using Ledrite No. 2, which is more ductile. It analyzes approximately 63% copper, 1.8% lead and remainder zinc. When a rich bronze color is required to match cast bronze, leaded commercial bronze 89 should be used. It contains about 89.5% copper, 2% lead and remainder zinc and has machinability rating of 80 percent.

To resist salt water corrosion naval brass No. 24 is widely used. This contains approximately 60% copper, 0.65% tin, and remainder zinc. Its machinability rating is 30 percent as compared to Ledrite No. 6. However, where higher machinability rating is required, naval brass is furnished with as low as 0.6% lead (machinability rating 50 percent) or as high as 1.75% lead (machinability rating 70 percent).

Manufacturers of screw machine products should avail themselves of Bridgeport laboratory service in regard to selecting the proper alloy and temper when confronted with a new or special job for which the regular free turning brass rod alloy is not satisfactory. The laboratory is also in a position to recommend other alloys such as silicon bronze and silicon-aluminum bronze for parts required to meet high physical properties for engineering applications or for resistance to excessive corrosion. Contact the nearest Bridgeport district office for any services which we can render on your metal problems. (8493)

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

Copper-Zinc Alloys vs. Sodium Hydroxide Solutions Containing Chlorine

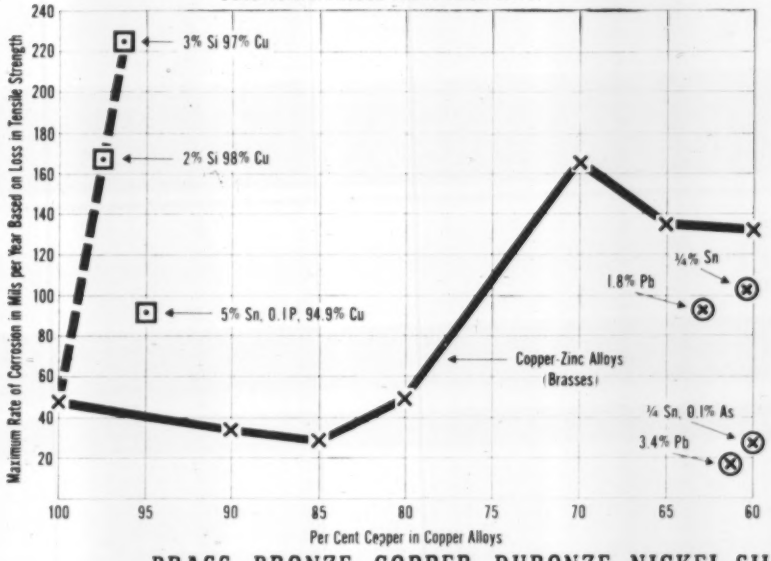
Sodium hydroxide containing dissolved chlorine gas behaves markedly different from pure sodium hydroxide solution or sodium hydroxide solutions with hydrogen sulfide. Chlorine dissolved in sodium hydroxide forms sodium hypochlorite and is commercially called chlorinated soda solution or bleach. Commercial bleach contains about 5% sodium hypochlorite, 4% NaCl and 1.0% sodium hydroxide (or carbonate) and is also used as a disinfectant for dairy and drinking utensils, swimming pools, animal quarters, etc.

The curve for maximum rate of corrosion based on loss in tensile strength at the water line for copper-zinc alloys shows that the corrosion rate decreases somewhat from 100 to 85% copper and then rapidly increases up to 70% copper and finally drops back to a lower rate of corrosion at 65-60% copper. The rates of corrosion for the submerged portions below the water line were 1/5 to 1/20 the rates obtained at the water line.

Data for copper-silicon, copper-tin alloys and modified brasses are also given. Those alloys above the copper-zinc alloy curve show decreased corrosion resistance and those below, increased corrosion resistance. In contrast with the effect of hydrogen sulfide (discussed in the two previous issues of the Copper Alloy Bulletin) in sodium hydroxide solution, the chlorine markedly increased the rate of corrosion of the copper-tin and copper-silicon alloys due to the solubility and unstable character of the corrosion products on the alloy surface.

The addition of ¾% tin to 60 Cu, 40 Zn alloy slightly increased the corrosion resistance. The addition of ¾% tin and 0.1% arsenic to 60 Cu, 40 Zn further increased the corrosion resistance. The most corrosion-resistant alloy is brass rod containing 3.4% lead. Under these conditions the lead-bearing corrosion products formed on the brass offered considerable protection to the underlying metal. This high-leaded brass alloy has proven more satisfactory than steel, stainless steel, nickel-copper alloys, aluminum, etc., for valves handling sodium hypochlorite solutions used in washing and sterilizing equipment.

RATE OF WATER LINE CORROSION OF COPPER ALLOYS IN 1.0 N SODIUM HYDROXIDE SOLUTION SATURATED WITH CHLORINE AT ROOM TEMPERATURE. 79 DAY TEST. SOLUTION CHANGED EVERY FOUR DAYS.



NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Semi-Automatic Coil Bender is said to be suitable for production line needs in serpentine coil bending. Equipped with single control lever, stationary bending form, rotation wiping shoe and semi-circular table to keep long coils in horizontal position during sweep of bending cycle. Averages 450 bends per hour. **No. 1291**

Quick-Change Soldering Iron Element features easily removed terminal block. Finger pressure on terminal guard is said to release terminal instantaneously. Element lead wires do not have to be fished around terminal. A steel spring guard reinforces terminal, preventing breakage. Brass sheath on element prevents damage to resistance wire and mica during replacement. **No. 1292**

Internal Diameter Groove Gage has long slender shank for insertion into deep bores. Uniform pressure to tips is said to eliminate operator "feel." Tips expand when trigger is released to give instant dial readings. Tips are thin enough to gage "O" Ring and Snap Ring Grooves. Gage is accurate to .0001 in. **No. 1293**

Scrap Bundling Machine for wire or strip forms compact cylinders around a revolving spindle. Available in two models to form rolls 18 in. in diameter and 18 in. long, and 24 x 24, machine transmits power to spindle by a sprocket and roller chain drive. Air pressure system is utilized to discharge bundled scrap. **No. 1294**

Dial Tape Dispenser, electrically operated, is reported to save 20% in time and gummed tape. Dialed with finger tip, dispenser selects tape length from 3 to 39 inches; lengths from 39 to 78 inches by two successive dialings. Handles paper, cloth or filament inserted tape in sizes 1 to 3 inches wide; rolls to 9 in. diameter. **No. 1295**

Hand Torch for brazing, glass working, light welding, soldering and electrical work burns natural gas, butane or propane with compressed air or oxygen (hydrogen where needed). Has grip control for automatic gas cutoff and five interchangeable flame units. Torch weighs 12 oz. **No. 1296**

Non-Slip Work Gloves coated with vinyl resins are said to resist acids, alkalies, oils, lubricants and most chemicals. They are highly abrasion resistant and remain flexible at low temperatures. Available in fully coated or palm coated types in many styles. **No. 1297**

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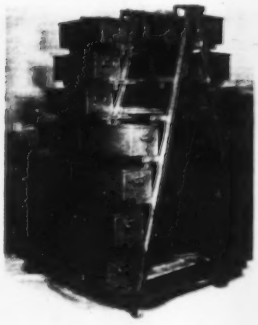
material handling, production or maintenance without nailing, drilling or welding.

Standard lengths can be cut and



assembled with a common wrench, or the frame can be engineered and cut to individual specifications. Ainsworth Mfg. Corp., Dept. ST, 2200 Franklin St., Detroit 7, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 5

Thermocouple Tube

. . . halves nickel requirements

Thermocouple - protecting tube made of nickel alloy uses about half as much nickel as previous models. Tubes are made of Incoloy, an alloy that has similar physical properties to Inconel. Industrial Division, Minneapolis-Honeywell Regulator Co., Dept. ST, Wayne & Windrim Aves., Philadelphia 44, Pa.

FOR MORE DATA—CIRCLE REPLY CARD NO. 6

Improved Refractory Gun

. . . loading made easier, faster

Redesigned model PM-1 Blastcrete gun provides easier, faster loading, better control of material flow and air pressure to meet ASME code for pressure vessels. Slide valve in the loading chamber provides improved loading. Feed

USE A REPLY CARD

Just circle the corresponding number of any item in this section for more information.

Yours FOR THE ASKING

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69. Large Compressors

Cooper-Bessemer Corp. — Type M power driven compressors range in size from 500 to 1000 hp and are designed for 80 to 110 psi discharge pressure. Information regarding design and performance of these machines, as well as typical installation views, are contained in 4-page illustrated bulletin M-65-A.

70. Tube Mill Machinery

Henry A. Spittler. Illustrated and described in 4-page bulletin "Precision Tube Mill Machinery" are semiautomatic tube benders, tube or bar straighteners, tube cutters and pointers, hammer tube swagers, tube draw bench and other machines.

71. Speed Reducers

Dodge Mfg. Co. — A complete line of shaft-mounted speed reducers with output speeds from 12 to 330 rpm and capacities from 1 to 43 hp is detailed in 20-page illustrated bulletin A-614-A. All data necessary for quick selection of proper drive unit are included. Also covered is Tri-Matic overload release for use with these Torque-Arm reducers.

72. Plating Solutions

Allied Chemical & Dye Corp., General Chemical Div. "The Modern Way to Electroplate Efficiently, Economically" is title of 20-page illustrated guide to the use of metal fluoborate solutions in plating lead, tin, iron, copper, nickel, cadmium and indium.

73. Shovel-Crane

Link-Belt Speeder Corp. 24-page illustrated catalog No. 2428 covers complete line of ½-yd shovel-cranes, including crawler, truck and wheel-mounted models. Specifications, operation and features are detailed.

74. Fastening Techniques

Milford Rivet & Machine Co. — "The Milford Method" is a 12-page brochure which deals with a scientific approach to products and parts assembly. It describes an integrated service of fastener research, design, application engineering and production collaboration which is offered by this company. A copy is yours for the asking.

75. Tap Data

Threadwell Tap & Die Co. — Pocket-size 56-page illustrated "Tap Manual" contains much data on taps, including basic information, sharpening, formulas, ordering, lubrication, speeds, tolerances, etc., etc. Many drawings are used in this "textbook."

76. Vibration Control

Felters Co. "Why It Pays to Anchor Your Machines with Unisorb" is 20-page illustrated booklet on machine anchoring material which controls transmitted vibration and noise. Covered are installation, materials, system's advantages and application to various machines, including lathes.

77. Spintesting Units

Warren Brothers Roads Co., Mfg. Div. Vacuum high speed testing unit for testing rotating parts at speeds up to and exceeding 100,000 rpm is subject of descriptive 4-page bulletin. Parts commonly tested are fan impellers, turbine and compressor rotors, accessory turbines and gyros.

78. V-Link Belting

Brammer Corp. Sizes and prices, advantages of V-link belts compared with endless V-belts. Brammer V-link vs. other detachable V-link belting; selection table with power correction factors; and assembly, installation and maintenance instructions are included in data book 205.

4-13-53

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79. V-Belt Drives & Sheaves

Pyott Foundry & Machine Co.—Containing revised data, 56-page catalog and reference book V-1000 provides all the necessary information required for specifying Pyott drives, Vee-Tex belts and sheaves. Drives from 1 to 1000 hp are specified, and drive and center ratios, sheave dimensions and belt speeds are fully tabulated.

80. Building Maintenance

Stonhard Co.—With 48 pages and lots of pictures, manual entitled "Over the Rough Spots" gives practical information on how to patch or resurface any type of floor, stop seepage, repair leaky roofs, preserve concrete or wood surfaces, protect structural steel, etc.

81. Push-Pull Controls

Simmonds Aerocessories, Inc.—Pictures, drawings and tables are utilized in 12-page illustrated manual on Simmonds push-pull controls to show how light and standard duty units in rigid or flexible housings can be employed in all types of equipment and machines.

82. Oil & Gas Burners

Coen Co.—Pac-O-Matic oil, gas and combination oil and gas burners available in 15 sizes from 50 to 900 hp, with various supply pressures and grades of fuel oil are described and illustrated in 8-page bulletin P-152. Units are packaged and preassembled for easy installation.

83. Precision Control Systems

Transicoil Corp.—Photographs and diagrams of precision automatic control components are found in 12-page bulletin MC1. Described are basic control motors, motor driven induction generators, miniature gear trains, servo amplifiers and combination units.

84. Texturized Metal

Rigidized Metals Corp.—Just how Rigid-Tex ferrous or nonferrous, solid or perforated, embossed and rigidized metals can be fabricated in same manner as plain sheets is explained in 6-page illustrated folder DR-852. Material can be bent, welded, soldered, riveted, formed, stamped, drawn or lock-seamed.

85. Wire Rope Data

Macwhyte Co.—If there's anything you want to know about wire rope, you'll find it in the 174-page pocket-size catalog G-15 offered to buyers and users of this versatile material. Technical information supplements the complete descriptions and specification tables to present a useful manual on the selection and application of wire rope and accessories.

86. Centrifugal Pumps

Ingersoll-Rand Co.—16-page bulletin 7223 on general-purpose centrifugal pumps of cradle-mounted type covers five basic cradle groups and 17 corresponding pump types, their capacities, horsepower ratings and uses. Two pages on pump dimensions and a table of performance under 60 cycle use are included.

EDITORIAL REPRINTS:

87. Use of Magnesium

Consumption of magnesium promises to rise at a rate unmatched by other metals in years to come, according to STEEL reprint "Magnesium's Sights Set High" by A. W. Winston of Dow Chemical Co. Currently, emphasis is on weight saving in military applications, but long range growth depends on additional civilian uses. New facilities provide a growth cushion.

88. Contouring

"Contouring Takes on the Heavyweights" is STEEL reprint by P. H. Gribbin, Kennametal Inc. engineer, which describes how improved contouring methods and carbide cutters are paying dividends in the heavy metal removal field.

89. The Blast Furnace

In Part III of C. E. Agnew's STEEL article, "Don't Write Off the Blast Furnace" the author questions the use of oxgen-enriched blast to correct a hanging or bridging furnace. He also shows how introduction of carbon monoxide with blast can be detrimental to furnace operation and economy. Reprint of this article is now available.

90. Titanium & Zirconium

Titanium and zirconium, as metals of the future, vied with steel for top interest at ASM session of the Western Metal Congress held in Los Angeles. Molybdenum and boron steel also received consideration. Highlights of papers presented are reported in STEEL reprint "New, Old Metals Share Advances."

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7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
9	19	29	39	49	59	69	79	89
10	20	30	40	50	60	70	80	90

STEEL 4-13-53

Penton Building, Cleveland 13, Ohio

Please send literature or detailed information on subjects circled at left to—

NAME

COMPANY

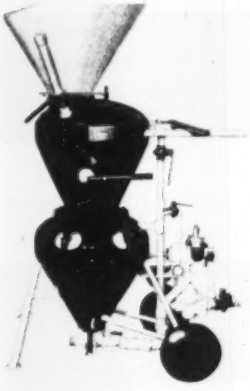
STREET

CITY AND STATE

Please print or type name and address. Circle numbers for subjects of interest.

flow control makes it possible to adjust material flow to any desired amount or to cut off material instantly when free air is desired. Air pressure can be controlled to any desired degree.

The gun handles material up to 6 per cent moisture, eliminating



the need for protection against normal atmospheric moisture. It places 1 to 5 cubic yards per hour, handling all cementitious materials for construction and all refractory materials as well as many lightweight aggregates. Blasterete Equipment Co. Inc., Dept. ST, 11154 Santa Monica Blvd., Los Angeles 25, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO 7

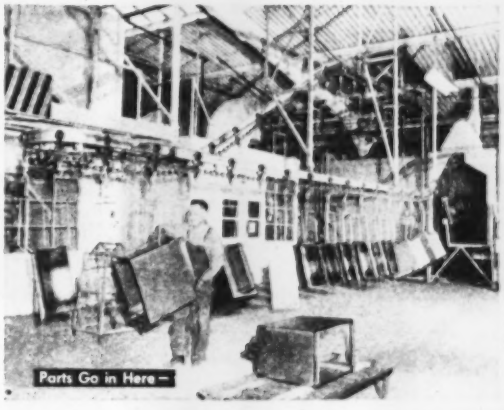
Induction Heating Detector

. . . direct temperature gage

Direct temperature measurement of visible work heated by most high frequency induction units, where speed of response must be fast and available target area is extremely small, is produced by this 8891-C Rayotube. Combined with a recorder or controller, the detector provides full

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

PD Double Decker



Making the MOST of LIMITED SPACE for Finishing Office Furniture

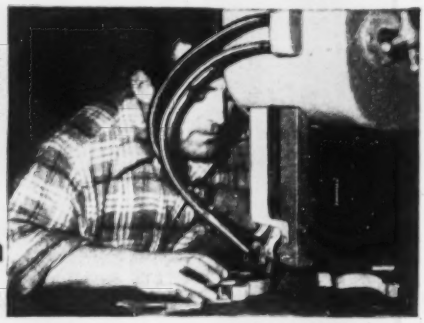
A manufacturer of office furniture had a problem. He wanted a complete finishing unit in his plant—from Bonderizing • to Drying Ovens • to Spray Booths • to Baking Ovens • **BUT *he didn't have much space.*** Peters-Dalton Engineers studied his plant—made the layout shown above—sent his products through a system that ***doubled*** his floor space. Overhead installations were laid out and made of the Air-Makeup System and Baking Ovens. The finishing line was sent ***around, over*** and ***under.*** Result: A compact finishing system, efficient to the Nth degree—yet utilizing plant cubic footage where before only square footage seemed available. **Write For Catalog.**

PD *Hydro-Whirl Paint Spray Booths* PD *Industrial Washing Equipment*
PD *Drying and Baking Ovens* PD *Hydro-Whirl Dust Collecting Systems*

PD Peters-Dalton INC.
17892 Ryan Road • Detroit 12, Michigan

YOU *Can* AVOID DIE COSTS COMPLETELY

On Your Next
STAMPING ORDER



Yes, you can – but it's not *necessarily* the best thing for you.

You want the lowest unit cost – *for the life of the part*, including re-runs. It may well be that our **Machine-Cut Method**, with no die cost, does work out best.

Or, it might better be our **Short Run Method**, using economical blanking dies and stock punches.

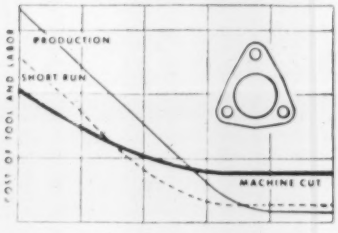
Sometimes, even with very short runs, it pays to use our **Production Method** with a standard die or our own surprisingly inexpensive Hecht-type tool.

In *any* case, the decision is a technical one based on many factors, not just length of run. You save money when the correct decision is made.

WE USE ALL THREE METHODS — LET US MAKE AN IMPARTIAL DECISION FOR YOU

For example, take the part illustrated. From 1-65 parts, our Machine-Cut Method is most economical. At 65 parts, the Short-Run Method is best until, at 7,000 units, the standard Production Method is most satisfactory.

These breaking points as charted vary drastically with every stamping, but the general principle remains the same.



LAMINATED SHIM COMPANY, INC.

Manufacturers of ALL TYPES OF SHIMS

STAMPINGS DIVISION

"ONE PIECE OR ONE MILLION"

STAMPINGS DIVISION, LAMINATED SHIM COMPANY
3404 Union Street, Glenbrook, Conn.

Gentlemen:

Please rush me my free copy of "SERVICE IN STAMPINGS"—the 12-page, illustrated booklet full of helpful facts on the economical buying of stampings.

NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

control of induction heating directly from work temperature.

Quick-sighting, double-mirror optical system permits sighting through a small opening to find desired target easily. All radiation from infrared to ultraviolet is focused at the same point. Thus, radiation outside the target area does not reach the highly sensitive thermopile. It can't be damaged by vibrations and operation is safe at ambient temperatures as high as 350° F. Leeds & Northrup Co., Dept. ST, 4901 Stenton Ave., Philadelphia 44, Pa.

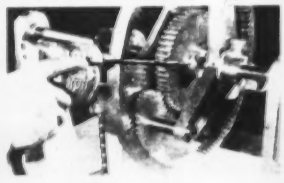
FOR MORE DATA—CIRCLE REPLY CARD NO. 8

Drill Extension Chucks

. . . fit without brazing

Drill extension rod and chucks fit over small diameter drills without time-consuming brazing or soldering. The extension units are designed to reduce the need for special length drills in hard-to-reach locations.

The 52 small diameter extension chucks fit one threaded drill extension rod and can be interchanged in seconds. Chuck sizes correspond to standard drill sizes. Beaver Tool Co., Dept. ST, Box 298, Huntington, Long Island, N. Y.



FOR MORE DATA—CIRCLE REPLY CARD NO. 9

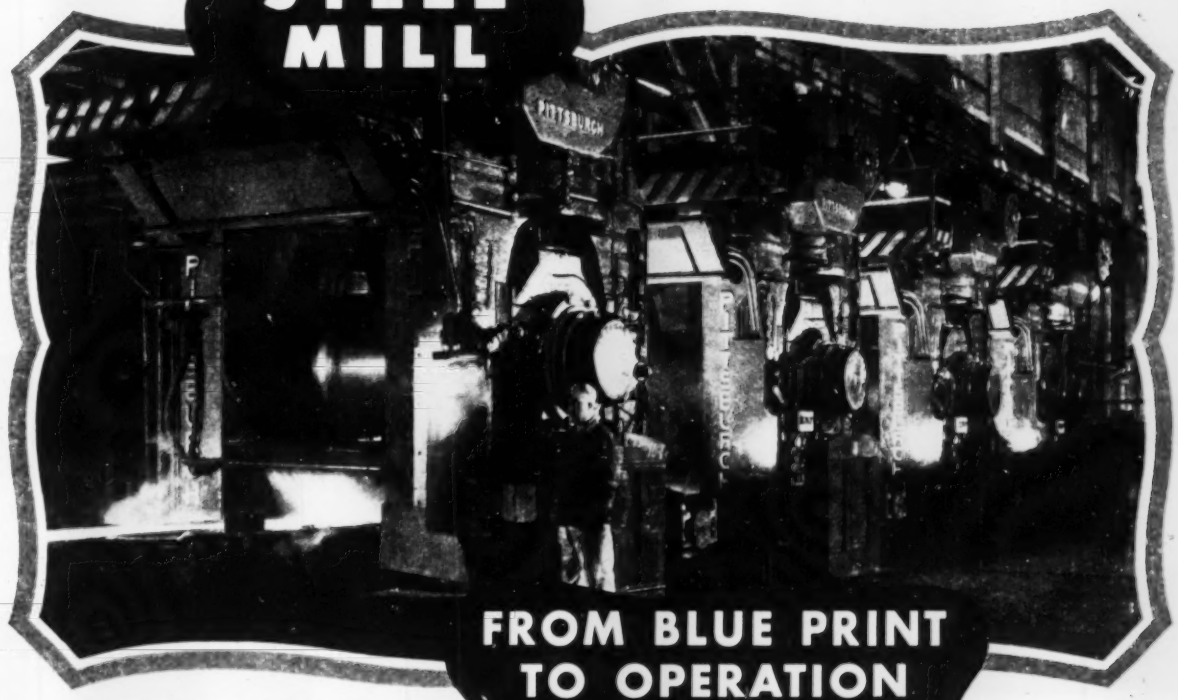
Metal Surface Cleaner

. . . works at room temperature

Solid cold metal cleaner, made for room temperature operation, is a powdered-to-granulated material, with free-flowing characteristics. The solid component used in conjunction with the manufacturer's liquid emulsion is a buffered system with absence of free caustic. It is capable of ready solution and dispersion in water.

By cleaning at room temperature, steam and attendant maintenance are eliminated. In addition,

Your STEEL MILL



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...WITH UNDIVIDED RESPONSIBILITY

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Designers and Builders—
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We specialize in the complete design and installation of modern mill machinery that will work harder with less maintenance resulting in greater economy of operation. Our facilities include engineering and manufacturing from *Blueprint* to *Operation* with *undivided responsibility*.

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ENGINEERING & MACHINE CO.

319 Farmer's Bank Bldg., Pittsburgh 22, Pa. • Plant at Glassport, Pa.

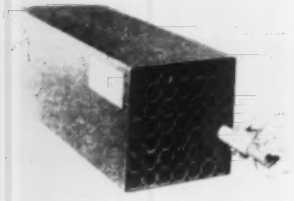
its action is reported to inhibit corrosion on cleaned surfaces. It prepares metal surfaces for easy self-draining and rinsing, exhibiting low or nonfoaming behavior even with high agitation. Nelson Chemicals Co., Dept. ST, 12345 Schaefer Highway, Detroit 27, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 10

Layout Tube File

. . . index co-ordinates material

Layouts and tracings can be filed using the mailing tube method with material made readily available by an index that relates to co-ordinated tubes in the file. Each Multi-roll file unit contains 49 individual tubes, each 1¾-inch ID. These are



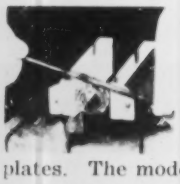
encased in a corrugated board container, secured to produce a unitized assembly of 200-pound test strength.

Contents of each tube compartment can be recorded on the index form furnished with the file. When alphabetical, topical or cross-referenced indexing is indicated, contents can be entered in a card file system. Three models provide tube lengths of 30, 42 and 54 inches. Roll & File Systems Inc., Dept. ST, Box 85, Ferndale 20, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 11

Vise-Jaw Face Plates

. . . guard against marred parts



Soft and finished materials are protected from vise jaw mars by these Nava-Mar face plates. The model eliminates time wasted on makeshifts; saves products through efficient, accurate work. Plates are made in ¼-inch sizes to fit any standard vise make up to 6 inches. Fastened by a set screw, they become an integral part of the vise jaw, but can be removed by a quick turn of the screwdriver.

Materials employed include bronze, aluminum and fiber or babbitt facings bonded to aluminum bodies. Maroth Engineering Division, Kenimar Corp., Dept. ST, Glenville, Conn.

FOR MORE DATA—CIRCLE REPLY CARD NO. 12

Combination Cable Connector

. . . attaches to holder

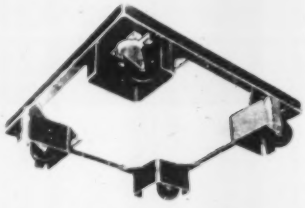
Welding cable can be attached to the Shortstub electrode holder by a screw clamping arrangement. A large contact area between the holder and cable and an extremely tight connection is made possible by use of a large ½-inch diameter fine thread socket screw. Bernard Welding Equipment Co., Dept. ST, 10222 Ave. N, Chicago 17, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 13

Heavy-Duty Dolly

. . . truck guards protect casters

Guards to protect casters when the dolly is lifted by a fork truck are employed on this heavy-duty unit. Swivel-tightened type casters are fitted with plungers that



can be engaged to lock casters at any fixed position.

Aluminum-magnesium construction provides a lightweight unit easy to move and carry. Platform has magnesium, aluminum or hardwood surface engineered to provide required strength and rigidity. Crescent Metal Products Inc., Dept. ST, 18901 St. Clair Ave., Cleveland 10, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 14

Silicone Ointment

. . . protects worker's hands

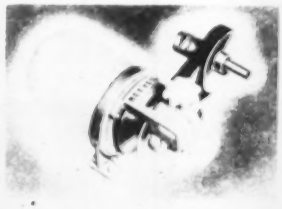
Silicote skin protective ointment protects worker's hands when they are exposed to water and other substances. It repels water and moisture and may be used either before exposure to prevent irritation or therapeutically to facilitate healing. Arnar-Stone Laboratories Inc., Dept. ST, 1316 Sherman Ave., Evanston, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 15

Variable Speed Drive

. . . ups application flexibility

Variable speed unit, called Flexi-Speed drive, can be mounted in any position around the driven equipment and can drive in any direction. It can deliver any speed within a ratio of 8 to 1. Speed control handwheel can be located parallel to or in any of eight positions



perpendicular to the motor shaft. Six different length belts offer a choice of shaft center distances.

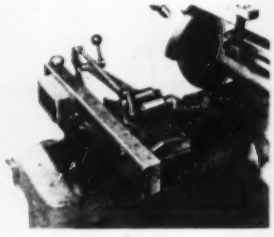
Drives are available in ½, ¾ and 1 hp capacities. They are adaptable to essentially all industrial applications, including those with in-line or right-angle reducers, countershafts, chain and sprocket or V-belt drives. Reeves Pulley Co., Dept. ST, Columbus, Ind.

FOR MORE DATA—CIRCLE REPLY CARD NO. 16

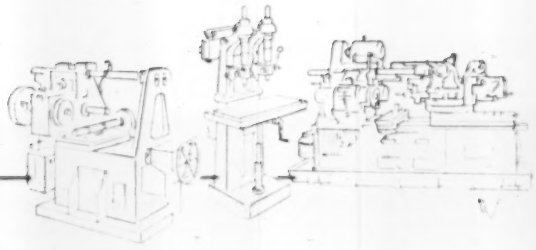
Rotary Planer Model

. . . mills structurals, castings

This rotary planer is used for milling structural members and castings such as ingot molds. The machine can be furnished with



various cutter head diameters to suit particular requirements. Cut shows a 48-inch head that has 4-inch in and out adjustment by



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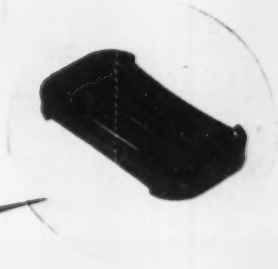
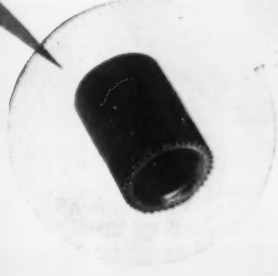
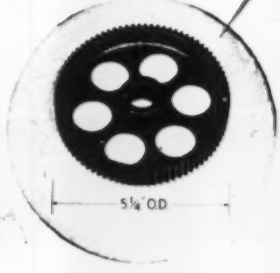
***Specify* OILITE**

PRODUCTS OF SINTERED METALS







With OILITE YOU:

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- Eliminate Tooling Programs
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- Conserve Strategic Material
- Get Quick Delivery

Other OILITE Advantages Include:

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- An Alternate Material
- Engineered Products
- No Machining
- Low Price
- Release Skilled Man Power For Other Jobs

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AMPLEX MANUFACTURING COMPANY

Subsidiary of Chrysler Corporation

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Oilite Products include: BEARINGS, Finished Machine Parts, Cored and Solid Bars, Permanent Filters, and Special Units.

Weld "difficult" steels with little or no pre-heat!

use P&H LOW-HYDROGEN ELECTRODES

P&H has the industry's most complete line of low-hydrogen electrodes — many custom-built to match the chemical analysis or heat-treating properties of a variety of alloy steels. Being hydrogen-free, these electrodes eliminate underbead cracking — little or no pre-heat is needed to get high-strength welds on problem steels, steel castings, nickel-alloy steels, chrome-moly steels, .40 carbon castings, high-hardenable steels, aircraft and similar steels. There are other important advantages, too — for example, lower cost, compared to stainless-steel electrodes formerly used on many jobs. Ask your P&H representative or distributor for all the facts. Or write for bulletin 5-26.

Chrome-moly header, typical of high-pressure, high-temperature applications.

Low-alloy casting, typical of applications where physical properties must be matched.

Alloy gear rim, typical application matching heat-treating properties of parent metal.

Excavator body, typical of heavy sections welded with P&H Low-Hydrogen Electrodes.

P&H WELDING DIVISION
HARNISCHFEGER CORPORATION
4411 W. National Ave. • Milwaukee 46, Wisconsin

the P&H *Line*

2495

means of handwheels arranged so adjustment can be made from either side of the carriage.

Planer is equipped with hydraulic feed for cutter head travel, operated by electrical control. Planing length is 7 feet, 6 inches with feed from 1 to 10½ inches. Head operates at 50 fpm. Cleveland Punch & Shear Works Co., Dept. ST, Cleveland 14, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 17

Safety Tank Car Platform

. . . gets men off car tops

Hazards of men working on curved tank car tops are eliminated by this safety platform. From the platform's grated deck, the operator can turn the entire platform 360 degrees, stopping at any angle

over the top of the car. When the operation permits, he can serve two cars—one on each set of tracks on either side of the platform.

The platform is properly balanced and rides on roller bearings, so is turned easily by the hand crank wheel which is geared to the supporting steel column. A foot brake holds the platform stable in stopped position. Nichols Engineering Co., Dept. ST, 3816 W. Grand Ave., Chicago, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 18

Truck-Mounted Flexible Shaft

. . . complete, easy portability

Truck mount consisting of a hand truck with wheeled rear axle and front skids, secures maximum portability for the manufacturer's flexible shaft machine. The mount is designed to counteract operators' habit of pulling the machine by the flexible shaft from point to point.

The unit is mounted on the truck deck in such a position that one operator merely presses down on the handle to lift the front skids. Handle is equipped with a fixed clamp that holds the handpiece and

tool. Thus, the equipment can be used as a fixed bench tool or a portable tool. N. A. Strand Division, Franklin Balmar Corp., Dept. ST, Baltimore 11, Md.

FOR MORE DATA—CIRCLE REPLY CARD NO. 19

Ammeter Shunts

. . . in sizes 150 to 10,000 amp

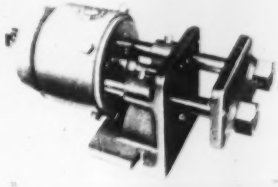
Direct current ammeter shunts designed for use with 50 millivolt meter instruments are available in sizes ranging from 150 to 10,000 amp. Units are calibrated to within ½ of 1 per cent accuracy and are complete with 10 foot calibrated leads. Rapid Electric Co., Dept. ST, 2881 Middletown Rd., Bronx 61, N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 20

Air-Controlled Vise

. . . synchronizing simplified

This simple air-controlled vise can be synchronized with operations of most machine tools. Design of the RIK vise places both air cylinder and stationary jaw on



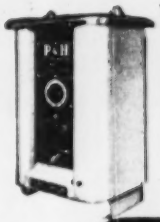
the same side of the workpiece. Result is greater safety and speed for the mill operator. Because the moving jaw is at the end of the as-

P&H

WELDING HEADQUARTERS

—that's where you find cost-cutting answers to welding problems

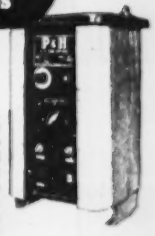
P&H AC WELDER



Any heat at your fingertips — right at the work — with Dial-lectric Instantaneous Remote Control. Sizes up to 625 amps., NEMA rated. Connectable to 220 and 440 volts.

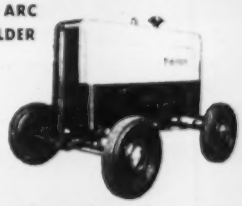
P&H WELDING TWINS

P&H DC RECTIFIER WELDER



Right now —at the work — fingertip Dial-lectric Control gives you the heat you need. Three sizes, 200, 300, and 500 amps., NEMA rated.

P&H WN-301 *Engine-Driven* DC ARC WELDER



It's portable—weld anywhere, anytime. Dial-lectric Control gives you fingertip heat control at the work — for faster, better welding. Runs at only 1750 rpm. Welding service range, 60-375 amps., NEMA rated.

P&H POSITIONERS

One finger is enough to position heavy weldments for economical downhand welding. Capacities from 2500 to 36,000 lbs. — remote-control and hand-operated models.

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The NEW T-H Exide-Ironclad

★ **20% more capacity in the same space**

★ **Lowest cost per A.H. to own and operate**

Heavier demands on all types of battery-powered haulage equipment dictate the need for batteries with greater capacity.

The new Exide-Ironclad T-H battery gives 20% more capacity in the same space—WITHOUT SACRIFICE OF LONG LIFE for which Exide-Ironclad Batteries are famous.

This new T-H battery is of the time-tested Exide-Ironclad construction, employing the exclusive slotted tube positive plate. New materials have made structural changes possible, which permit the use of larger positive plates—resulting in increased capacity.

The T-H line of Exide-Ironclad Batteries includes capacities for all battery-powered haulage units.

Now—more than ever before... YOUR BEST POWER BUY AT ANY PRICE!

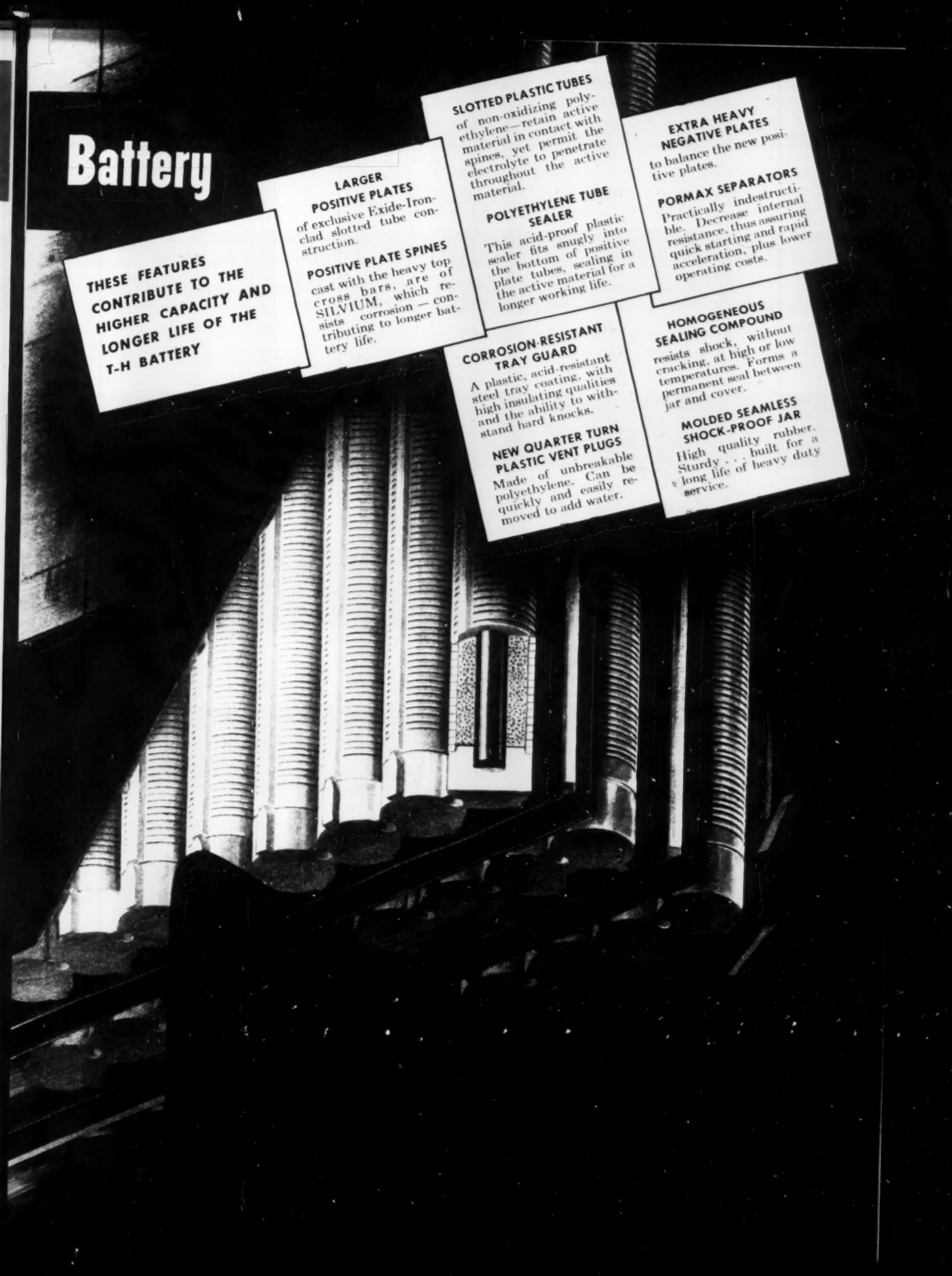
Thrifty Hauler

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 2

Exide Batteries of Canada, Limited, Toronto

1888—DEPENDABLE BATTERIES FOR 65 YEARS—1953

"EXIDE", "EXIDE-IRONCLAD", "SILVALUM", "PORMAX", Reg. T.M. U.S. Pat. Off.


Battery
THESE FEATURES CONTRIBUTE TO THE HIGHER CAPACITY AND LONGER LIFE OF THE T-H BATTERY
LARGER POSITIVE PLATES
of exclusive Exide-Ironclad slotted tube construction.
POSITIVE PLATE SPINES
cast with the heavy top cross bars, are of SILVIUM, which resists corrosion — contributing to longer battery life.
SLOTTED PLASTIC TUBES
of non-oxidizing polyethylene—retain active material in contact with spines, yet permit the electrolyte to penetrate throughout the active material.
POLYETHYLENE TUBE SEALER
This acid-proof plastic sealer fits snugly into the bottom of positive plate tubes, sealing in the active material for a longer working life.
EXTRA HEAVY NEGATIVE PLATES
to balance the new positive plates.
PORMAX SEPARATORS
Practically indestructible. Decrease internal resistance, thus assuring quick starting and rapid acceleration, plus lower operating costs.
CORROSION-RESISTANT TRAY GUARD
A plastic, acid-resistant steel tray coating, with high insulating qualities and the ability to withstand hard knocks.
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Made of unbreakable polyethylene. Can be quickly and easily removed to add water.
HOMOGENEOUS SEALING COMPOUND
resists shock, without cracking, at high or low temperatures. Forms a permanent seal between jar and cover.
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High quality rubber. Sturdy . . . built for a long life of heavy duty service.

SHENANGO Centrifugal CASTINGS

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use **SHENANGO BAR STOCK**
for superior quality parts!

If you are looking for a superior bar stock, Shenango tubular and solid stock is for you! Shenango Meehanite Metal bars have exceptionally fine grain, higher tensile strength, finer, more uniform graphite dispersion. So naturally you can count on superior wear-life, and less chance of breakage or distortion in service.

Learn more about the money-saving qualities that make Shenango solid and tubular bar stock a preferred material for bearings, bushings, pump parts, liners, sleeves, gears, dies, gauges, and many other common and special parts. Send for the new Shenango Bar Stock Bulletin No. 152, containing additional information and a list of standard, conveniently stocked sizes.

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MONEL METAL • NI-RESIST • MEEHANITE® METAL

NEW PRODUCTS and equipment

sembly instead of next to the air cylinder, the cutting tool need not pass over the cylinder.

Overall length is 12 inches; jaw height, 5½ inches; and width, 4½ inches. Standard jaw opening reaches 2 inches, while a special 6-inch opening is available. Wilson Bohannan Co., Dept. ST, Marion, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 21

Spur Gear Tester

. . . gage reads in 0.0005-inch

Floating head rests on precision steel balls to provide extreme sensitivity in this spur gear tester. Head contacts a dial gage reading in 0.0005-inch. For measuring center distance, a rustproof scale and vernier is furnished reading in 0.001-inch.

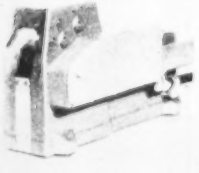
For quick, easy visibility, the

scale has a bright chromium finish. Slides are drilled and tapped for mounting vertical center supports for inspection of pinion gears. The gears to be tested are placed on fixed arbors or studs, avoiding rotating shafts that might introduce errors. George Scherr Co. Inc., Dept. ST, 200 Lafayette St., New York 12, N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 22

Air-Operated Tape Dispenser

. . . delivers tape automatically



Speed and accuracy are characteristics of this automatic air-operated tape dispenser. Adjustable for various lengths and sizes of tape, the foot pedal control reduces dispensing time to zero and delivers at the same position in every operation. The dispenser attaches to any factory air line. Air Fixtures Inc., Dept. ST, N. Manchester, Ind.

FOR MORE DATA—CIRCLE REPLY CARD NO. 23

Dull Tools Sap Aluminum Alloy Strength

Series of tests show effect of poor cutting edges and inadequate coolant on tensile and yield strength. Overheating may carry temperature into critical range

IMPORTANCE of good practice in machining heat-treated aluminum alloys to strength and quality of finished products is re-emphasized in tests conducted by engineers at Harvey Machine Co. Inc., Torrance, Calif. Results show that serious losses in tensile and yield strengths occur from overheating when machining tools are permitted to become dull.

Absence of any indications to inspectors that weaknesses due to overheating exist, plus the very practical difficulty in exercising technical supervision over all machining operations, lend significance to the findings. Experienced machinists are well aware that considerable care should be maintained in machining strong aluminum alloys to prevent overheating. More obscure is the fact that the overheating resulting when cutting tools become dull may carry the material's temperature into critical ranges, in the absence of adequate coolant.

Sharp Contrast — A routine investigation run by Harvey to define factors that produce variations in mechanical properties of machined aluminum alloys led that firm to point up the effect of dull tools. In the first tests, a series of standard flat tensile specimens was taken from alloy 75S-T6 extruded shapes. These flats were prepared by milling one set with a sharp, well-designed cutter. They milled a second set with a dull cutter having insufficient clearance angle.

Specimens were taken adjacent to each other to preclude any variables other than temperatures during machining. The company tested four duplicate specimens of 75S-T6 alloy. In these, reductions of as much as 14.9 per cent in tensile strength and 16.4 per cent in yield strength were found, as indicated in Table I.

Projected Effect—When average characteristics were compared with those of similar specimens submitted to measured furnace temperatures, it became apparent that temperatures reached during machining with the dull cutter were in excess of 500 F for about 2 minutes. Had this temperature been maintained for as long as 5 minutes, which could occur in a heavy milling cut, tensile strength would have been lowered by approximately 20,000 psi.

Continuing the study, tests were made of alloy 24S-T4 specimens prepared similarly. With this alloy, maximum reduction in tensile strength due to overheating with the dull cutter was 8 per cent; maximum yield strength reduction reached 31.6 per cent, as shown in Table II. The overheating had no appreciable or predictable effect on elongation characteristics.

Third Phase —In a third test phase, random 0.505-inch diameter bars were turned from 1⅝-inch diameter extruded rod on a lathe turning at 1200 rpm. Six bars were cut with a sharp tool, six with a dull tool and no coolant was employed in either case. The alloy was high-strength HZM11-T6, an experimental aluminum-zinc magnesium-copper type developed by Harvey. Average tensile and yield strength reductions were both about 20 per cent, as illustrated in Table III.

Results indicate that otherwise unexplainable weaknesses in machined heat-treated aluminum alloys may stem from inadvertently high temperatures during machining operations. It makes imperative the use of adequate coolant and sharp, well-designed cutting tools to gain uniform strength characteristic of finished products.

TABLE I—75S-T6 ALLOY

Specimen	Tensile Strength, Psi — Sharp Cutter	Tensile Strength, Psi — Dull Cutter	Tensile Strength, Psi — Per Cent Reduction	Yield Strength, Psi — Sharp Cutter	Yield Strength, Psi — Dull Cutter	Yield Strength, Psi — Per Cent Reduction	Elongation, % in 2 In. — Sharp Cutter	Elongation, % in 2 In. — Dull Cutter
1	90,000	82,000	8.9	80,000	70,000	12.5	12.0	10.0
2	88,000	78,000	11.4	80,000	67,000	16.2	11.0	10.0
3	92,500	79,000	14.9	82,500	69,000	16.4	10.0	12.0
4	86,300	82,000	5.0	77,700	69,000	11.2	9.5	8.5
		Average Reduction	10.1		Average Reduction	14.1		

TABLE II—24S-T4 ALLOY

Specimen	Tensile Strength, Psi — Sharp Cutter	Tensile Strength, Psi — Dull Cutter	Tensile Strength, Psi — Per Cent Reduction	Yield Strength, Psi — Sharp Cutter	Yield Strength, Psi — Dull Cutter	Yield Strength, Psi — Per Cent Reduction	Elongation, % in 2 In. — Sharp Cutter	Elongation, % in 2 In. — Dull Cutter
1	63,000	60,000	4.8	46,750	32,000	31.6	18.0	15.0
2	62,750	60,100	4.2	47,250	37,000	21.7	18.0	14.0
3	65,500	62,000	5.3	50,000	41,000	18.0	17.0	17.5
4	63,600	58,500	8.0	45,800	40,500	11.6	20.0	19.0
		Average Reduction	5.6		Average Reduction	20.7		

TABLE III—HZM11-T6

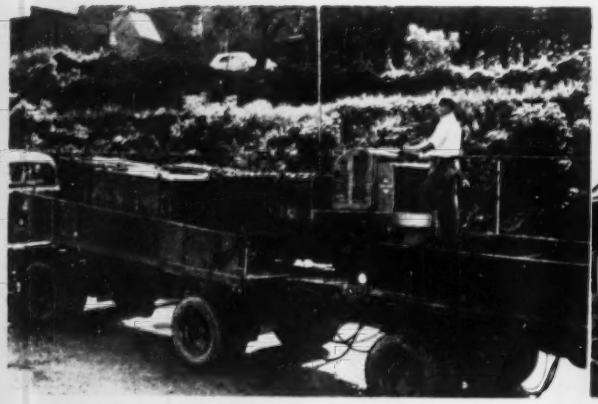
Tensile Strength, Psi — Sharp Cutting Tool	Tensile Strength, Psi — Dull Cutting Tool	Yield Strength, Psi — Sharp Cutting Tool	Yield Strength, Psi — Dull Cutting Tool	Elongation, % in 2 In. — Sharp Cutting Tool	Elongation, % in 2 In. — Dull Cutting Tool
97,750	68,750	88,750	59,250	10.0	9.0
95,700	82,500	86,500	74,500	9.0	8.0
97,750	73,500	87,500	65,500	8.5	8.0
98,000	80,000	87,500	72,000	9.0	8.0
99,125	87,250	89,250	80,000	8.0	8.0
97,000	76,000	85,500	66,750	8.5	8.0
Avg 97,554	78,000	87,500	69,666		
% Difference	20.0%		20.4%		

Screw Conveyor Range Shown

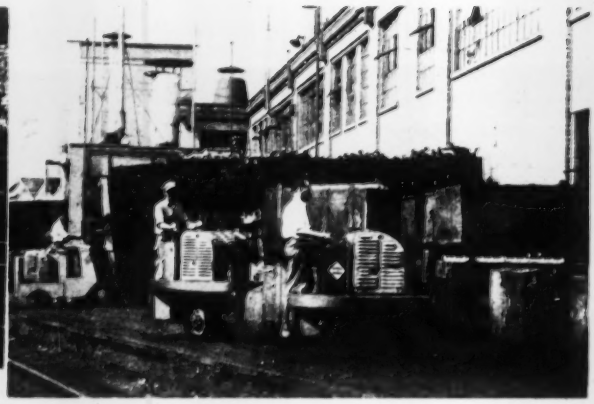
Comprehensive information on screw conveyors and feeders is provided in a 92-page book released by Link-Belt Co. The screw conveyor, one of the oldest and simplest conveying mediums, is also one of the most versatile, as shown by the wide assortment of materials handled. One table lists 250 materials, classifying them by size, flowability, abrasiveness, average weight and other characteristics.

Detailed engineering information, with selection tables and horsepower formulas, layouts and arrangements, dimensional data and part numbers, permits selection of screw conveyors and feeders for many applications. Typical applications of specialized conveyor screws are also shown.

Copies are available from the company, 307 N. Michigan Ave., Chicago 1.



Special tailgate arrangement permits the 6000-pound capacity truck to unload both truck trailers quickly. Gates are dropped from rear and front to form a truck bridge



Three basic types of industrial trucks find service in the handling operation. Low-lift platform unloads, high-lift stacks skids and fork model handles skids or pallets

Casting Jam-up Yields to Mechanical Handling

MECHANIZED handling of castings not only slashed transportation costs 50 per cent, but eliminated completely the expensive variables of manual effort. Incoming loads are handled eight times faster by trucks that move 640 tons a day.

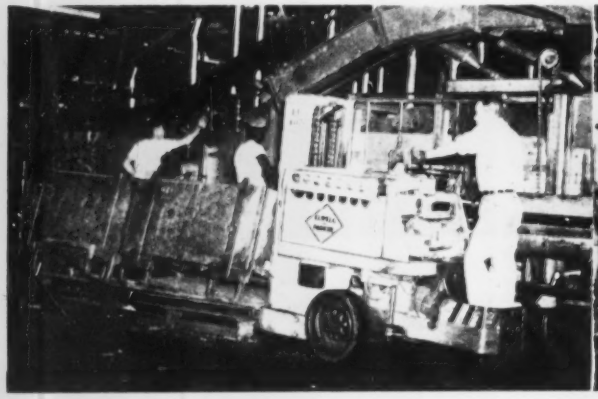
This is the summary Chevrolet Motor Co. makes to show how its Flint, Mich., plant licked a problem of handling incoming castings that recently threatened to become acute.

An Army of Men — Castings designated for automotive engines were dumped into railroad cars at the foundry. When they arrived at the engine plant, parts had to be sorted, counted and loaded manually into pushcarts for transfer to storage. The job required an army of men, caused inefficient and excessive physical effort. Other liabilities followed naturally: Counts were inaccurate and loose shipment made freight rates high.

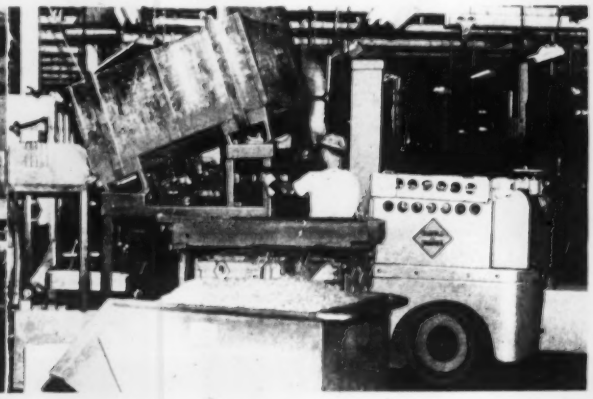
To inject some order and clear away unnecessary manpower, the plant enlisted co-operation at the source of its troubles and helped itself at the other end.

Ordered Delivery—As a result, each casting class leaves the foundry in a special skid box. Road trucks now deliver skids to the assembly plant. At the receiving dock, an Elwell-Parker low-platform truck moves directly into the over-the-road vehicle and transfers skids to the dock. Another E-P truck double stacks the skids in storage or takes them immediately to production machines. Each truck handles 40 tons an hour, 16 hours a day.

Chevrolet says transportation costs were halved. The powered platform truck unloads a 12-skid truckload in 15 minutes—in sharp contrast to the discarded manual method that required several hours. Finally, but still very important, inventories are always accurate.



Skids are delivered to the production area by truck and placed on a tilt rack, a positioner designed to facilitate unloading of parts at the machine work stations



Trucks place boxes with swing-up doors on tilt racks so contents flow within reach of operator. This method upped machine productivity 100 per cent over hand unloading

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Shop records keep proving the logic of using **J&L "1200"** COLD FINISHED STEEL in terms of

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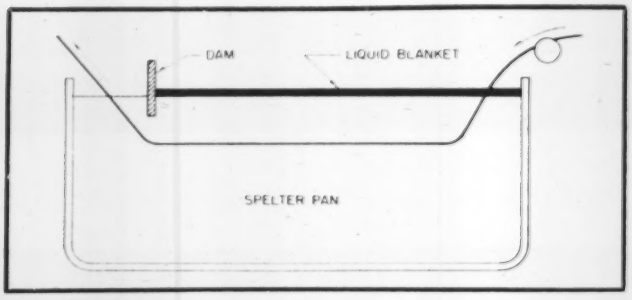


Fig. 1—Diagram above shows the liquid chemical blanket for spelter pans

Fig. 2—Crystals added to galvanizing pan maintain fluidity of blanket

Liquid Blanket

REDUCES OXIDATION OF MOLTEN ZINC

Regenerative crystals added to galvanizing bath serve to maintain fluidity of blanket which in turn effects sharp reduction of dross formation

By A. A. PATERSON
Dewey & Almy Chemical Co
Chicago

CONSIDERABLE zinc is lost annually in the wire galvanizing industry because of the formation of oxide and dross. The oxide or ash, formed by the combination of oxygen in the air and molten zinc in the pan, contains about 80 per cent zinc. Since the recovery value is small the formation of such a zinc oxide either in the gaseous or ash form represents an annual loss totaling hundreds of thousands of dollars.

From the beginning of the galvanizing art, many attempts were made to prevent formation of this oxide by covering the exposed surface of molten zinc with dry materials, such as the oxide or ash itself, diatomaceous earth, or carbon in any of its many forms. These dry methods offered some protection, but because of the air diffused through these porous dry blankets, oxidation continued. In addition, these dry blankets interfered with the stringing of wires and with the drossing operation.

Surface Is Sealed—Obviously, the best method to overcome this problem was to utilize a liquid which would completely seal the surface of the zinc pan from the oxygen of the air and remain fluid over the life of the pan, as shown in Fig. 1. Many attempts were made to use various combinations of zinc and ammonium chlorides. Most of these chloride combinations showed up well for a limited period, but after a few hours in service they thickened to the point where they had to be removed.

Over ten years ago research work with tinning and soldering crystals, led to an investigation of a liquid blanket for galvanizing pans which would remain fluid for a reasonable length of time, and require little, if any, extra labor for maintenance.

Experiments with this liquid blanket continued and finally resulted in the development of regenerative crystals which when added to the liquid blanket tend to maintain its fluidity. Some of the field test data are presented in the accompanying tables. A different method is used in each table for calculating costs and savings depending upon the interests and method of cost evaluation in the particular plant. Also, the percentage savings may vary somewhat from one pan to another even in the same plant, depending largely upon the type of galvanizing, weight of wire, practice of the individual galvanizer, size of pan, temperature, etc. An interesting observation is that in all of these figures the reduction of the formation of zinc oxide is almost in direct relation to the proportion of the galvanizing pan covered with the blanket.

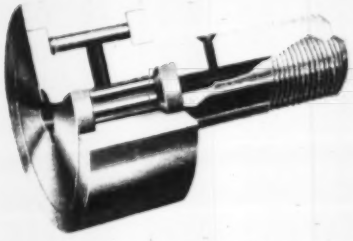
Portion Is Unblanketed—Normally a portion of the galvanizing pan is dammed off sufficiently to allow the galvanized wire to come out through an unblanketed section. However, one plant found that on a frame of galvanizing wire for re-

CAM ACTION IMPROVED with MULTIROL® BEARINGS

under heavier loads • with shock resistance • and space economy

Modern demands for faster, more automatic machines necessitate a new approach to cam action efficiency. Improvised bolt and roller units are no longer adequate for this mass production machine age.

Machinery manufacturers are finding that even at slow speed, it is difficult to carry the usual heavy radial and intermittent shock loads of cam application efficiently on plain bearings or standard antifriction ball and roller bearings. With increasing speeds, and lubrication limited by the desire for simplified design, the plain bearing wears excessively and fails early. Ordinary ball or radial roller bearings used on a shaft as cam followers have a



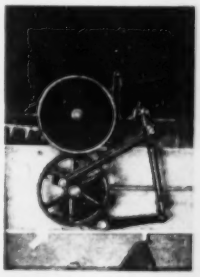
tendency to split in the outer race because of the excessive strain on the thin and superhard race sections.

One bearing that has proven particularly successful in cam follower applications is the Multirol CF series full type roller bearing. This bearing is built especially for the repeated shock loads of typical cam action operations. The outer race section is not only heavy radiclly but is also martempered to combine maximum toughness with adequate surface hardness for withstanding the punishment of cam applications. The outer ring operates on a full complement of small diameter rollers so the load is evenly distributed over a greater bearing surface. The inner race and flange are made in a single piece with the stud, preventing any possibility of disassembly in operation. Greater accuracy is maintained throughout longer bearing life and, compared with plain bearings, both starting and rolling friction are reduced to a minimum. As a result internal wear is diminished and power requirements of Multirol bearing equipped machines are appreciably lessened.

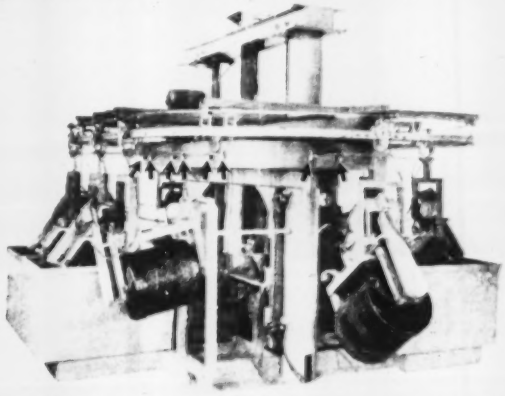
Load Capacity Comparison

To illustrate the increased capacity of the Multirol CF, here is a comparison between a Multirol CF-1 bearing and a corresponding friction type roller, making use of the maximum permissable bearing pressures in pounds per square inch of projected area. The CF-1 bearing will have a maximum of 2240# while the equivalent friction type roller would have a capacity of less than 400#.

What This Means in Terms of Performance

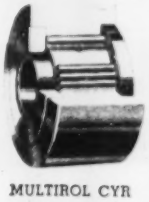


The James Hunter Machine Co., of North Adams, Massachusetts replaced units consisting of a standard roller" bearing and hardened roller with Multirol C." bearings on eccentric cams that actuate rake teeth in their wool washers. The changeover reduced their original and replacement costs over 10% and reduced maintenance to occasional lubrication. Where previously rollers only lasted a maximum of several months, no replacements have been required with the Multirol bearings. As a result, the Multirol Bearings solved a trouble spot that brought in many customer complaints.



Crown Rheostat and Supply Company of Chicago uses up to 200 Multirol Cam Followers as guide and support rollers in the travel and transfer mechanism of their cleaning, plating, and drying machines. Formerly trolleys were suspended from rails but the cam follower units proved to be a more precision means of friction reduction and added stability to the supporting arms.

Other McGILL® Bearings



MULTIROL CYR

MULTIROL SE

GUIDEROL CT

A new 140-page Bearing Reference Guide complete with 30 pages of vital engineering data has just been released by the McGill Manufacturing Company. It has the full story on the advantages of Multirol CF Bearings as well as information on the Multirol CYR, Multirol SE and Guiderol Bearings. Send now for your copy of McGill Catalog No. 52.

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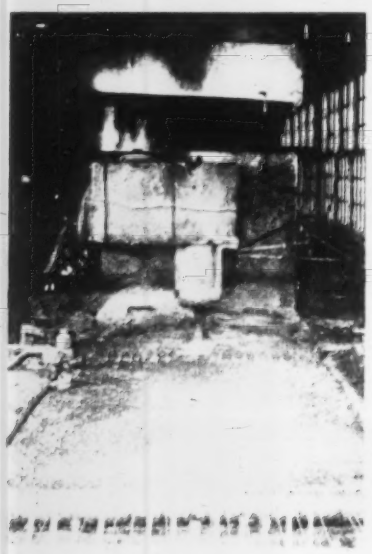

Fig. 3—One of the most important functions of the blanket is the elimination of noxious zinc oxide fumes

TABLE I

Savings Per 100 Pounds of Zinc Applied to Wire

	Without blanket, lb	With blanket, lb	Unit cost, $	Saving, $
Blanket crystals used	None	82	0.156*	—12.79
Oxide skimmings produced	550	86	0.0975**	45.24
Dross produced	378	43	0.039**	13.07
Net saving per 1000 lb zinc on wire				$45.52

* This includes 1c per pound freight

** Difference in original cost of high-grade zinc content (13.6c per pound) and sale value of oxide skimmings or dross (using 2c/c as value of skimmings and 70% as value of dross)

Size of kettle: 3 × 10 ft

Area covered by blanket: 24 sq ft

TABLE II

Savings in Zinc on Galvanizing Frame Running 6 to 18 Gage Wire

	With liquid blanket*	Same frame with diatomaceous earth**	Savings through use of liquid blanket
Tons of wire	8122	926	
Skimmings	35,084	13,605	
Lb/ton	4.3	14.6	10.3 lb/ton less skimmings with liquid blanket (70.5% saving)
Dross	127,060	34,910	
Lb/ton	15.6	37.7	22.2 lb/ton less dross under blanket
Zinc	562,275	87,175	
Lb/ton	69.2	94.1	24.9 lb/ton less zinc used under blanket (26.5% saving)

* Accumulated figures on 7 months' production

** Represents figures on 1 month's production

TABLE III

Demonstrated Savings in Daily Consumption of Spelter on Fine Wire Galvanizing Frame 16 Inches Wide by 96 Inches Long

	Lb
Average daily consumption* of zinc prior to use of blanket**	330
Average daily consumption of zinc using blanket	110
Zinc savings obtained through use of blanket	220

* 24-hour day, 7-day week

** No covering, other than ash, used prior to test

TABLE IV

Savings Shown on Frame Running 12 Gage Wire

	With liquid blanket	Without liquid blanket	Savings obtained through use of liquid blanket
Zinc	36.5 lb/ton	41.0 lb/ton	4.5 lb/ton or 11.0% less zinc used for similar weight of wire run.
Skimmings (Ash or oxide)	3.7 lb/ton	10.0 lb/ton	6.3 lb/ton or 63% less skimming produced with liquid blanket.

Liquid blanket cost which included use of blanket crystals as preflux approximately 40.0c/ton

All figures are based on tons of wire run over period of approximately 5 weeks

drawing, better results are obtained by completely covering the pan, allowing the wire to come out through the liquid blanket. Also reported is the depositing of a heavier zinc coating. In this case a special double wipe is necessary.

Another real saving on practically all liquid blanket installations is the reduction of dross formation. Why this occurs is a mystery, but still it is a definite saving. The answer possibly lies in the reduction of the available iron ion through the use of the crystals as a preflux and the fluxing action of the blanket immediately prior to entry into the zinc pan. The amount of reduction varies widely but only one installation without dross saving was noted.

Other advantages of the liquid blanket, in addition to the savings in zinc, follow:

A definite reduction in the spattering of zinc both at the point where the wires enter the pan and also when pigs are added to the pan. The greater surface tension of the liquid blanket compared with the dry blanket accounts for this.

The virtual elimination of noxious zinc oxide fumes by preventing their formation. This feature alone is one of the most important functions of the blanket.

Reduction of prefluxing costs by using a solution of the regenerative crystals as a preflux. This automatic addition also minimizes the maintenance cost of the blanket. With this preflux method, additions of the crystals as shown in Fig. 2* are made at the rate of one to two shovelfuls each shift. These new additions quickly enter into the liquid blanket, as shown in Fig. 3.

In many cases the necessity of a burlap wipe between the preflux tank and the spelter pan is eliminated, due to a great reduction of spattering.

Insulation value of the liquid blanket reduces heat losses. In one particular test the surface of the liquid blanket was 410° F cooler than the surface of the zinc oxide ash when the blanket was not employed.

Increased production of galvanized work per ton of zinc available in workhouse stocks. Elimination of ash formation in the blanketed area and the expected reduction of dross formation means that less zinc is required to galvanize a given tonnage of wire.

This new liquid blanket has shown savings of $0.50 to $1.50 per ton of wire run as well as the possibility of reducing zinc inventory 10 to 50 per cent.

The most serious problem generally encountered is the escape of the white ammonium chloride smoke, particularly when the blanket is first applied. This is not objectionable to the workmen when adequate ventilation is provided. Various combinations of flues and exhaust systems are effective depending upon the facilities and requirements of the individual plant. After the blanket is formed initially, the continued evolution of ammonium chloride is slight and hardly noticeable.

*Photos are by Dahlhauser, Keystone Steel & Wire Co., Peoria, Ill.

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WHO IS HE?

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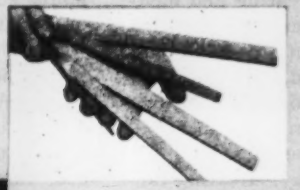
He explores the globe for new and improved equipment, appliances and other items that may speed up your production and cut your costs.

He has a reservoir of information about tools and machines from which you can benefit year after year.

As a "clearing house" for all your plant-operating requisites within the foregoing scope, your Industrial Distributor can take over from you a lot of costly bookkeeping—and headaches.

By serving many industrial consumers he also serves many producers, thus reducing *their* "paper work" too... which consequently enables them to pass further savings along to you.

YES, the industrial distributing system has so many advantages to all who use it that it is an indispensable and valuable factor in the economics of free enterprise. Nicholson continues to subscribe to its principles in both words and action.



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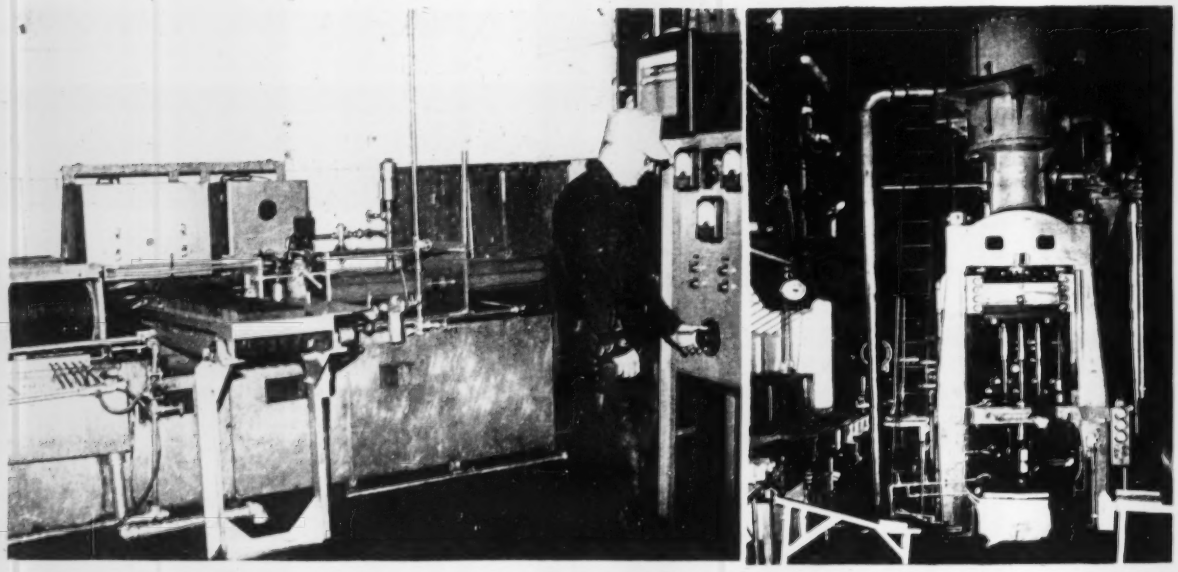


View of the loading end of the 1200 kw billet heater shows the ram (behind operator) which pushes billets into the low frequency coil at the left. The discharge end of the heater and the shell forging machine are shown at right

DUAL FREQUENCY HEATING:

Lower Costs Open New Fields

Low frequency coils in tandem with high frequency high-heat coils prove that induction heating can be practical in forging applications. Future looks bright

By M. E. HACKSTEDDE
Manager
GECO Inc.
Cleveland

DUAL FREQUENCY induction heating is out of the pilot installation stage.

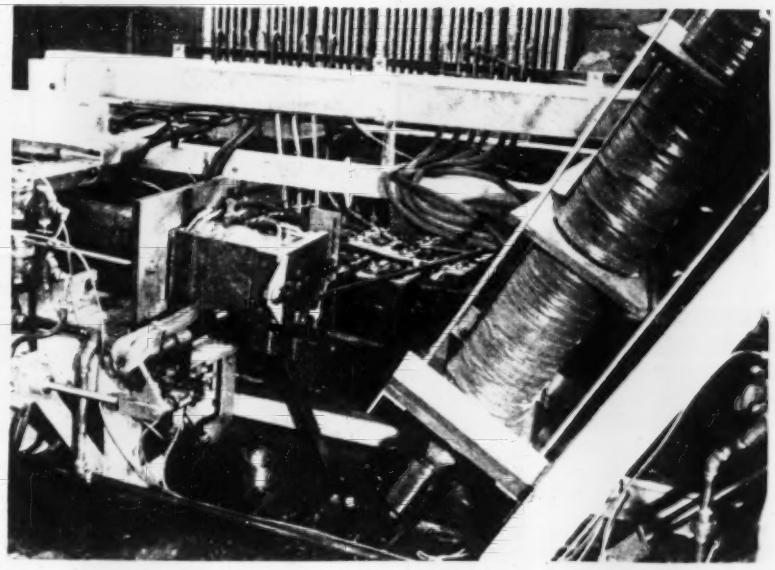
Developed several years ago by General Engineering Co. Ltd., Toronto, Canada, as a means of reducing costs of induction heating for many applications in the field of forging, heat treating and melting, it is now standard equipment at the Lindsay, Ont., plant of Canadian Arsenals Ltd.

Billet heating for shell forging, and shell hardening and drawing are accomplished on dual frequency machines at Lindsay. Heating tunnels on both machines are made up of sections containing the 60-cycle inductor coils for heating to 1400 F and the high heat sections containing coils delivering nearly 1000 cycles. Low frequency coils work on line voltage up to 550 volts without frequency converters or transformers. Where high frequency power is required, General Engineering has designed and had built self-excited generators said to be more rugged and cheaper than present motor generators.

Billet Heater — Briefly, a billet heater is made up of two main parts: A billet feeder mechanism consisting of a feed magazine and a hydraulic or pneumatically-operated ram for pushing the cold billet into the heating tunnel, and a heating tunnel consisting of several inductor coils mounted in tandem and with suitable liners.

The only manual operation required is the loading of the feed magazine with cold billets as the heated billet is ejected from the heater to a position handy to the press or hammer. Usually in a billet heating operation about half of the total power required can be applied to the inductors directly from the 60-cycle line, the balance being a higher frequency. Such an arrangement eliminates one half of the motor generator capacity required with a substantial reduction in equipment cost.

Efficiency Advantage — Production figures up to 6½ pounds per kilowatt hour (measured at the power companies' 60-cycle meters) can be obtained, so it is evident



Pivoted inductor coil drops heated shell through chute into quench tank below floor level, from where it is lifted into the inclined drawing coils at right. Operation is completely automatic except for manual loading of line

that no loss in efficiency results from the use of 60-cycle preheat.

Because of the much greater penetration of the 60-cycle current it is possible to heat at a more rapid rate without overheating the outside surface of the billet than with higher frequencies. Consequently the over-all heating time for each billet can be reduced and better uniformity of temperature from the center to the outside surface of the billet can be obtained.

Hardening and Drawing—Another more unique operation is also in daily production at the Lindsay plant. This dual frequency machine completely hardens and draws 3-inch, 50-caliber antiaircraft shells at the rate of 60 per minute in a space 6 feet wide by 18 feet long. The gravity conveyor for air cooling the shell from the draw, extends another 20 feet in the line.

Problems in heating a hollow shell with a solid base and a tapering tubular body to a uniform temperature throughout with induction heating are many. In fact with the usual frequencies used, it is quite impractical. However, by the careful selection of frequencies shells are uniformly heated, quenched in oil, and drawn, in a continuous operation with completely automatic control from the feeding of the shell into the heating tunnel until it emerges as a hardened and drawn shell at the end of the cooling conveyor.

Hand Loading—One man loads the feed magazine, although this too could be an automatic transfer from the previous operation if the production rates were the same. In this operation as in the billet heater, cold shells are pushed, one after another, at regularly timed intervals into the 60-cycle portion of the heating tunnel.

The shell leaves the 60-cycle section at approximately 1400 F and enters the high frequency inductors where it is brought up to quenching temperature. This section is made up of two coils powered by a self-excited generator delivering somewhat less than 1000 cycles. The first of these coils is stationary and mounted directly in line with the 60-cycle coils. The second coil is mounted on a pivot and is tilted from a horizontal to a vertical position by a pneumatically-operated cylinder.

Oil Quenching—When the shell in this coil has reached the desired temperature it is tilted and the shell drops into the oil quench tank below. Oil is maintained at a constant level and is circulated through a Niagara heat exchanger to maintain it at the desired temperature. The shell drops into the tank open end down so that it is positioned over a spigot through which quench oil is discharged into the tank.

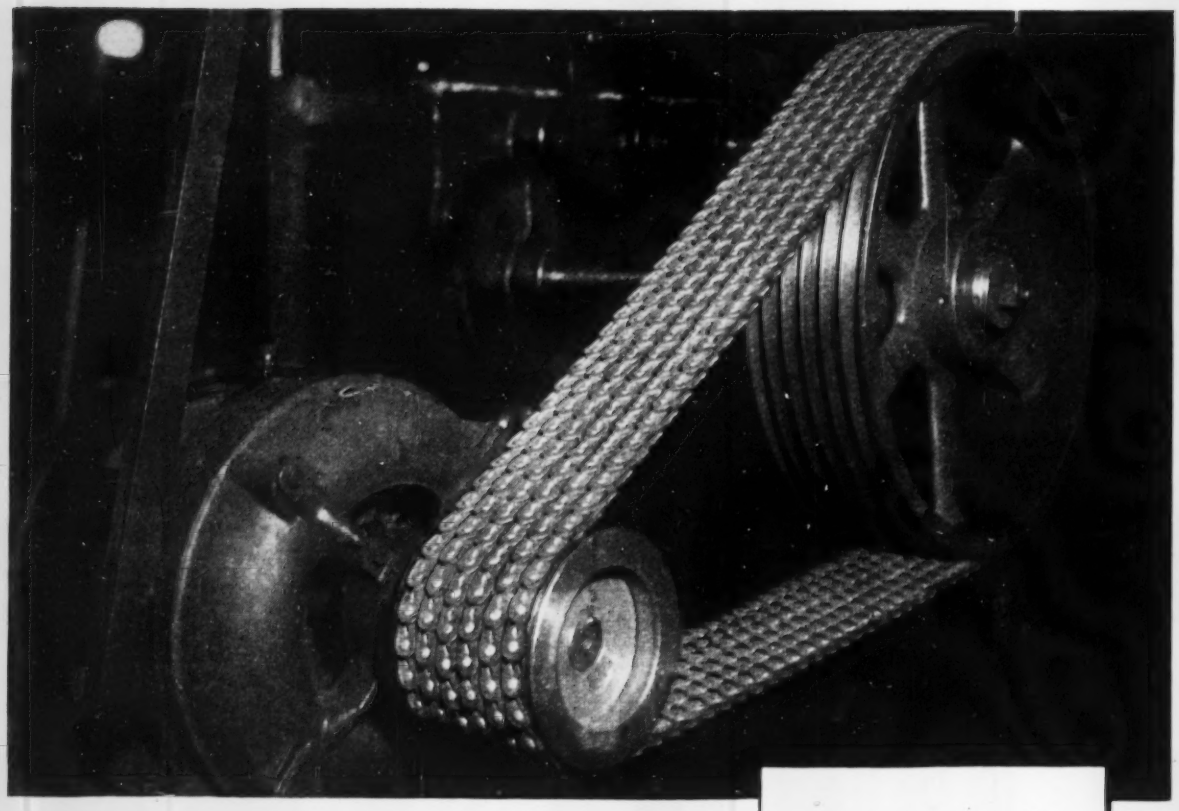
Other jets of oil directed at the external surfaces of the shell assure fast and uniform quenching. At a predetermined time the spigot is automatically tilted so that the shell is moved into an inclined position from which another pneumatic device lifts it into the inclined draw coils.

Low Frequency Draw—The shell is drawn at approximately 1000 F or whatever temperature that heat of steel may require. The draw coils are powered directly from the 550-v 3-phase 60-cycle power line. When the shell emerges from the inductors about 8 feet above floor level it has been heated uniformly to the exact temperature required to produce the physical specifications for that shell.

After the heated shell leaves the draw coils it travels on a gravity conveyor which is long enough to hold one full lot of shell and which retains the shell until it has air cooled to a safe temperature for rapid cooling. It is then water cooled to room temperature for handling and passes over another conveyor back into the machining line.

Many Advantages — This heat treating unit is extremely simple and trouble free. It can be started into production in a few minutes and stopped by pushing a button. When the unit is not in operation it uses no power. While it is possible to equip it with elaborate temperature and electrical controls, experience has proved that such instruments are not required and add nothing to the operation but increased cost.

This particular machine has one ammeter indicating the current in one of the high frequency coils. As long as this meter is reading at a predetermined value, the shell in that coil has reached the proper temperature. It is possible to adjust both the rate of feed of the shell and the power input to the various coils, however, minor variations in shell can be compensated for easily by adjustments of the rate of feed.



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CALENDAR
OF MEETINGS

April 14-15, Westinghouse Machine Tool Electrification Forum: Annual session, Hotel Statler, Buffalo. Information: E. F. Grapes, technical publicity, Box 2278, Pittsburgh 30.

April 14-16, Conveyor Equipment Manufacturers Association and University of Illinois Department of Engineering: Conveyor institute, University of Illinois, Champaign, Ill.

April 16-17, American Machine Tool Distributors Association: Spring meeting, Netherland Plaza hotel, Cincinnati. Association address: 1900 Arch St., Philadelphia 3. Secretary: Thomas A. Fernely Jr.

April 16-17, The Wire Association: Regional meeting, Stacy-Trent hotel, Trenton, N. J. Association address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

April 16-19, Grinding Wheel Institute: Spring meeting, The Homestead, Hot Springs, Va. Institute address: 2130 Keith Bldg., Cleveland 15. Manager: Hunter-Thomas Associates, re F. A. Peterson.

April 18-19, Packaging Machinery Manufacturers Institute: Spring meeting, Hotel Sheraton, Chicago. Institute address: 342 Madison Ave., New York 17. Secretary: Helen L. Stratton.

April 19-23, American Hardware Manufacturers Association: Spring meeting, Hotel Adolphus, Dallas. Association address: 342 Madison Ave., New York 17. Secretary: Arthur L. Faubel.

April 20-22, Metal Powder Association: Annual meeting and exhibit, Hotel Cleveland, Cleveland. Association address: 420 Lexington Ave., New York 17. Secretary: Robert L. Ziegfeld.

April 20-22, AIME Blast Furnace, Coke Oven & Raw Materials Committee and National Open Hearth Steel Committee: Annual conference, Hotel Statler, Buffalo. Institute address: 29 W. 39th St., New York 18.

April 20-23, American Management Association: National Packaging Exposition; Navy Pier, Chicago. Association address: 330 W. 42nd St., New York 36. Information: Donald G. Keen.

April 20-23, National Screw Machine Products Association: Spring meeting, Hotel St. Moritz, New York. Association address: 2860 E. 130th St., Cleveland 20. Secretary: Orrin B. Werntz.

April 20-23, Society of Automotive Engineers: Aeronautic production forum; national aeronautic meeting, and aircraft engineering display, Hotels Governor Clinton & Statler, New York. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

April 21-23, Caster & Floor Truck Manufacturers Association: Spring meeting, Edgewater Beach hotel, Chicago. Association address: 27 E. Monroe, Chicago. Secretary: H. P. Dolan.

April 22-23, American Institute of Steel Construction Inc.: Spring engineering conference, Detroit Engineering Society Bldg., Detroit. Institute address: 101 Park Ave., New York. Executive vice president: L. Abbett Post.

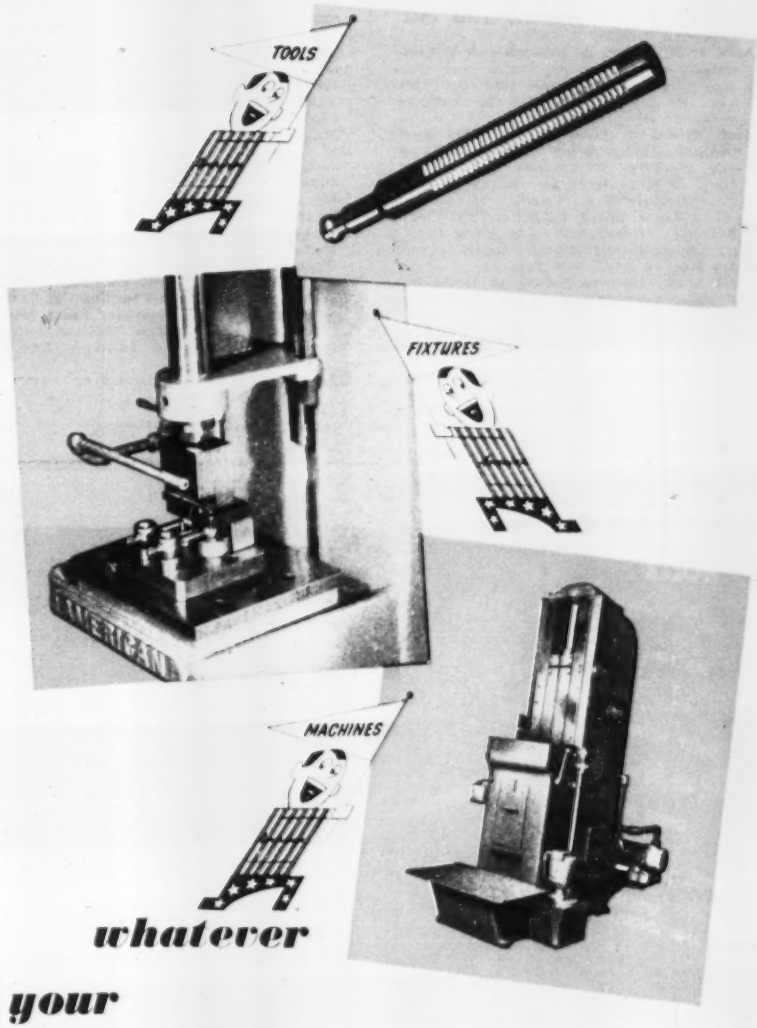
April 25, American Society for Metals, Indiana Chapters: Annual spring symposium, Purdue University, W. Lafayette, Ind. Information: A. D. Carvin, Jo-lyn Stainless Steels, Ft. Wayne, Ind.

April 26-30, American Ceramic Society: Annual meeting, Hotel Statler, New York. Society address: 2525 N. High St., Columbus 2, O. Secretary: Charles S. Pearce.

April 27-28, American Zinc Institute Inc.: Annual meeting, Hotel Statler, St. Louis. Institute address: 60 E. 42nd St., New York 17. Secretary: E. V. Gent.

April 27-28, Galvanizers Committee, American Zinc Institute: Annual meeting, Hotel Statler, St. Louis. Institute address: 60 E. 42nd St., New York 17. Secretary-Treasurer: E. V. Gent.

April 27-28, Independent Petroleum Association of America: Midyear meeting, St. Louis.



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Association address: Box 1619, Tulsa, Okla. President: Charles H. Lyons.

April 27-28, Copper & Brass Research Association: Annual meeting, Drake hotel, Chicago. Association address: 1420 New York Ave., NW, Washington 5. Corresponding secretary: Mrs. Elizabeth Dyer.

April 27-May 2, Concrete Reinforcing Steel Institute: Annual spring meeting, The Carolina, Pinehurst, N. Carolina. Institute address: 38 S. Dearborn St., Chicago 3. Managing director: H. C. Inczer.

April 27-May 8, British Industries Fair: Castle Bromwich, Birmingham, and Earls Court, London, Eng. Information: Larry Noon, 575 Madison Ave., New York 22.

April 28-30, American Society of Mechanical Engineers: Spring meeting, Deshler-Wallick hotel, Columbus, O. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

April 29-May 1, Boston Section, American Institute of Electrical Engineers: Northeastern district meeting, Hotel Sheraton Plaza, Boston. Institute address: 33 W. 39th St., New York.

April 29-May 1, Radio-Television Manufacturers Association: Electronic Components Symposium, Shakespeare Club, Pasadena, Calif. Information: Suite 1011, 621 S. Hope St., Los Angeles 17.

May 3-7, Liquefied Petroleum Gas Association: Annual meeting and exhibit, Hotel Conrad Hilton, Chicago. Association address: 11 S. LaSalle St., Chicago 3. Secretary: Arthur C. Kreutzer.

May 4-6, National Small Businessmen's Association: Annual meeting, Hotel Mayflower, Washington. Association address: Evanston, Ill. Vice president: A. W. Kimball.

May 6-8, Porcelain Enamel Institute: Mid-year divisional meetings, Edgewater Beach hotel, Chicago. Institute address: 1346 Connecticut Ave. NW, Washington 6. Secretary: John C. Oliver.

May 7-8, The Wire Association: Regional meeting, Mt. Royal hotel, Montreal. Association address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

May 8, American Society for Metals: New England regional meeting, Hotel Bond, Hartford, Conn. Information: Walter E. Borin, Underwood Corp., Hartford 6, Conn.

May 7-8, Industrial Fasteners Institute: Annual meeting, Westchester Country Club, Rye, N. Y. Institute address: 3648 Euclid Ave., Cleveland. Secretary: James H. Eggers.

May 11-13, Rail Steel Bar Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 38 S. Dearborn St., Chicago 3. Secretary: W. H. Jacobs.

May 11-14, American Mining Congress: Annual meeting and exposition, Public Auditorium, Cleveland. Congress address: 1102 Ring Bldg., Washington 6. Executive vice president: Julian D. Conover.

May 14, Conference, Instrumentation in Water, Sewage and Industrial Waste Treatment: Manhattan College, New York. Information: Joseph McCabe, Civil Engineering Dept., Manhattan College.

May 14-15, National Association of Sheet Metal Distributors: Spring meeting, Deshler-Wallick hotel, Columbus, O. Association address: 1900 Arch St., Philadelphia 3. Secretary: Thomas A. Fernley Jr.

May 14-16, American Coal Sales Association: Annual spring meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 1625 Eye St. NW, Washington. Executive vice president: W. W. Bayfield.

May 14-16, American Institute of Mining & Metallurgical Engineers: Pacific Northwest metals and minerals conference, Hotel Benjamin Franklin, Seattle. Institute address: 29 W. 39th St., New York 18. Secretary: E. H. Robie.

May 18-19, National Fluid Power Association: Organization meeting, Bedford Springs hotel, Bedford Springs, Pa. Association address: 1618 Orrington Ave., Evanston, Ill. Temporary executive secretary: Barrett Rogers.

May 18-19, Association of Iron & Steel Engineers: Spring meeting, Hotel Statler, Buffalo, N. Y. Association address: 1010 Empire Bldg., Pittsburgh. Secretary: T. J. Ess.

May 18-20, Industrial Furnace Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 120 Lexington Ave., New York.

May 18-22, Material Handling Institute: National Material Handling Exposition, Convention Hall, Philadelphia. Institute address: 811 Clark Bldg., Pittsburgh 22. Managing director: R. Kennedy Hanson.

May 18-22, Conference, Cam Design and Tool Selection: Rochester Institute of Technology, Rochester, N. Y. Information: Robert D. Pease, associate director, RIT.

May 20-22, Gas Appliance Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 60 E. 42nd St., New York 17. Secretary: H. Leigh Whitelaw.

May 20-22, Society for Experimental Stress Analysis: Spring meeting, Hotel Schroeder, Milwaukee. Society address: Box 168, Cambridge 39, Mass. Secretary-treasurer: W. M. Murray.

May 21-22, National Industrial Conference Board: General session and directors meeting, Waldorf-Astoria hotel, New York. Board address: 247 Park Ave., New York. Secretary: Clyde L. Rogers.

May 24-27, Copper & Brass Research Association: Annual meeting, The Homestead, Hot Springs, Va. Association Address: 420 Lexington Ave., New York 17. Secretary: B. B. Caddle.

May 24-28, Scientific Apparatus Makers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 20 N. Wacker Drive, Chicago 6. Executive vice-president: Kenneth B. Anderson.

May 24-28, National Industrial Service Association: Annual convention, Hotel Statler, New York. Association address: 818 Olive St., St. Louis 1. Executive secretary: Fred B. Whipperman.

May 26-27, Electric Heating Committee and Michigan Section, AIEE: Conference, Detroit-Leland hotel, Detroit. Institute address: 33 W. 39th St., New York 18. Information: W. C. Rudd.

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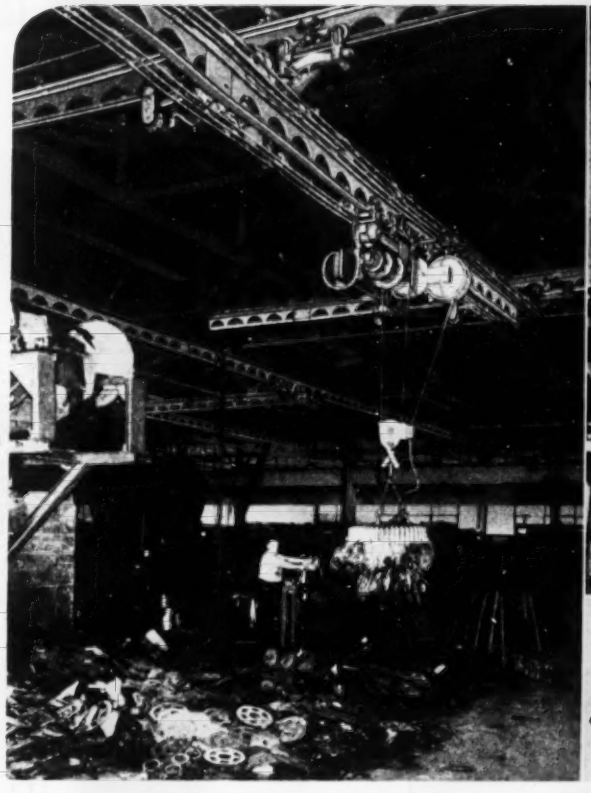

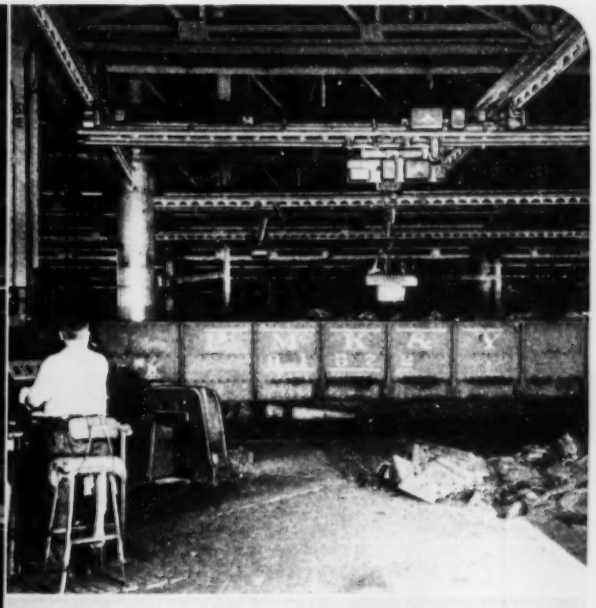

Baled scrap is handled directly from baler to railroad car by the same crane.

Scrap from slat conveyor is dumped on floor at left. Crane with magnet then takes it to baling machine next to operator who operates all controls — crane, magnet, baler — from this one point.

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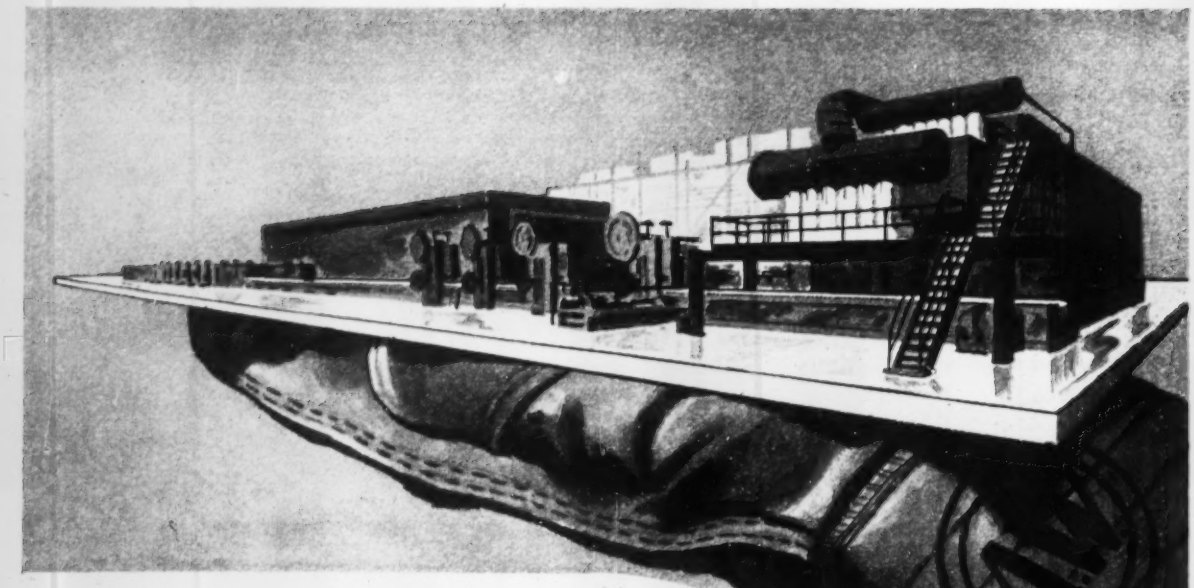

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The Market Outlook

LABOR TROUBLES that have held down steel production the last two weeks may be just the beginning of quickie strikes that will plague the steel industry the next few months, but you can rule out the possibility of an industry-wide steel strike.

Latest flare-up was a strike last week of 100 employees of a U. S. Steel Corp. railroad serving U. S. Steel plants at Youngstown. Without materials transportation, the steel plants could do nothing but close down. This idled about 10,000 steelworkers and cost 8000 tons of ingot output daily.

The preceding week was marred similarly by a five-day strike on a U. S. Steel railroad serving U. S. Steel plants in the Pittsburgh district.

COMING UP—Other quickie strikes may arise without authorization while the United Steelworkers of America-CIO and the steel companies negotiate on wages. Such strikes often occur during this period.

The union's president, David J. McDonald, called a meeting of the union's executive board and wage policy committee for Apr. 27 and 28 at Atlantic City, N. J., to map a wage program to present to the steel industry.

Under agreements signed last summer after the two-month nationwide steel strike, either the union or the industry can give notice to the other on or before May 1 of its desire to negotiate concerning a change in wage rates. Presumably this formal notice to the companies will be given after the wage policy committee meeting in Atlantic City.

THE THREAT—Negotiating sessions must begin within 30 days after May 1. If there is no agreement by midnight of June 30, the steelworkers are free to strike to enforce their demands. Although any wage negotiations might boil over into a strike, there are deterrents to a strike this year. Among them are: 1. It was only last summer that the steelworkers were out on a long strike, and they aren't eager to be on strike so soon again. 2. The slight softening that's evident in some quarters of the steel business may have a sobering effect on demands and attitudes of the steelworkers' union. 3. For the first time the union will not have the government supporting it in negotiations.

PARTIAL RECOVERY—The strike in the Youngstown area, the aftereffects of the Pittsburgh district strike and shutdown of a Pittsburgh district open-hearth shop for inspection held the rate of output of steel for ingots and castings to 98 per cent in the week ended Apr. 11. Were it not for these interruptions the rate could have been three of four points higher.

CONTRASTS—While heavy demand from the automobile industry keeps some forms of steel, particularly light flat-rolled, in tight supply, other forms continue to ease or show signs of easing.

Heavy and wide plates have been in tight supply but in the Pittsburgh area there are definite signs producers would like assurance of a solid market for the fourth quarter. In lighter gage plates, producers are almost current with their order books.

BUILDING INVENTORIES—Demand for high carbon wire continues strong and a good third quarter is expected, but it may not equal output of the first two quarters. Even if automotive and furniture makers continue their strong demand for material, other customers are currently buying in excess of needs and probably will have good inventories by third quarter.

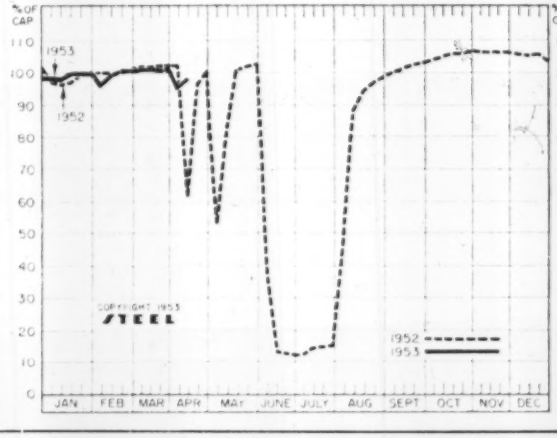
PRICE PICTURE—Buttweld pipe stocks are building up, and some distributors are lowering their prices for it.

Because slow business at foundries is holding down demand for merchant pig iron, there is some talk of freight absorption by pig iron sellers who want to go farther afield for customers.

The good stocks of scrap mills now have are inducing a softening of scrap prices.

Not all price trends were down, however. Bolt, nut and rivet prices are being raised an average of 2 to 3 per cent.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged at leading production points)

	Week Ended Apr. 11	Change	Same Week 1952	Same Week 1951
Pittsburgh	95.5	+ 17.5*	62	101.5
Chicago	105.5	— 2*	52.5	106
Mid-Atlantic	96.5	— 0.5	76	100.5
Youngstown	105.5	— 0.5	40	106
Wheeling	101	0*	86	94.5
Cleveland	101.5	+ 2.5	48.5	101.5
Buffalo	106.5	0	55	104
Birmingham	101	+ 2	50	100
New England	91	1	67	86
Cincinnati	98.5	+ 1.5	60	102
St. Louis	71.5	— 9.5	23.5	92.5
Detroit	100	+ 2	91	103.5
Western	110	2	86.5	107
Estimated national rate	98	+ 3	61.5	102.5

*Change from preceding week's revised rate.

Weekly steelmaking capacity is estimated at 2,254,459 net tons in 1953; 2,027,086 tons in 1952; 1,966,634 tons in 1951.

The Metalworking Outlook—p. 55 Production-Engineering News—p. 105

Composite Market Averages

FINISHED STEEL PRICE INDEX:	Apr. 7	Mar. 31	Month	March
Bureau of Labor Statistics	1953	1953	Ago	Average
(1947-1949 = 100)	130.7	130.7	130.7	130.7

AVERAGE PRICES (BUREAU OF LABOR STATISTICS)
Week Ended Apr. 7, 1953

Units are 100 lb except where otherwise noted below in parentheses. For complete description of products see insert following p. 28, STEEL, Sept. 8, 1952.

Rails	$3.775	Sheets, C.R. carbon	$5.275
Track spikes	6.650	Sheets, galv.	6.765
Track bolts	9.958	Strip, C.R., carbon	5.100
Tie plates	4.775	Strip, C.R. stainless (lb)	0.333
Joint bars	4.925	Pipe, black, buttweld (100 ft)	7.090
Plates, carbon	4.150	Pipe, galv., buttweld (100 ft)	8.778
Structural shapes	4.200	Boiler tubes (100 ft)	31.663
Bars, tool steel (lb)	1.576	Tin plate (100 lb base box)	8.950
Bars, 3120 alloy	6.685	Terne plate (100 lb base box)	7.750
Bars, stainless (lb)	0.153	Wire, carbon, merchant	6.075
Bars, carbon	4.100	Wire, fence, galv.	6.425
Bars, reinforcing	4.050	Nails (100 lb kegs)	7.410
Bars, C.F. carbon	5.925	Wire, barbed (80 rod spool)	5.880
Sheets, H.R. carbon	4.125	Woven wire fence (20 rod roll)	13.629

FINISHED PRICE INDEX, Weighted:

Calculated by STEEL*	Apr. 9 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	181.31	181.31	181.31	171.92	135.91
Index in cents per lb.	4.912	4.912	4.912	4.657	3.682

ARITHMETICAL PRICE COMPOSITES:

Calculated by STEEL*					
Finished Steel NT	$110.98	$110.98	$110.98	$106.32	$81.14
No. 2 Fdry. Pig Iron, GT	55.64	55.64	55.64	52.54	39.65
Basic Pig Iron, GT	54.66	54.66	54.66	52.16	39.18
Malleable Pig Iron, GT	55.77	55.77	55.77	53.27	40.26
Steelmaking Scrap, GT	43.33	42.75	45.00	43.00	40.42

* For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS	Apr. 9 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.95	3.95	3.95	3.70	2.90
Bars, H.R., Chicago	3.95	3.95	3.95	3.70	2.90
Bars, H.R., del Philadelphia	4.502	4.502	4.502	4.223	3.856
Bars, C.F., Pittsburgh	4.925	4.925	4.925	4.55	3.55
Shapes, Std., Pittsburgh	3.85	3.85	3.85	3.65	2.80
Shapes, Std., Chicago	3.85	3.85	3.85	3.65	2.80
Shapes, del., Philadelphia	4.13	4.13	4.13	3.918	2.968
Plates, Pittsburgh	3.90	3.90	3.90	3.70	2.95
Plates, Chicago	3.90	3.90	3.90	3.70	2.95
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.15	3.45
Plates, Sparrows Point, Md.	3.90	3.90	3.90	3.70	2.95
Plates, Claymont, Del.	4.35	4.35	4.35	4.15	3.65
Sheets, H.R., Pittsburgh	3.775	3.775	3.775	3.60-.75	2.80
Sheets, H.R., Chicago	3.775	3.775	3.775	3.60	2.80
Sheets, C.R., Pittsburgh	4.575	4.575	4.575	4.35	3.55
Sheets, C.R., Chicago	4.575	4.575	4.575	4.35	3.55
Sheets, C.R., Detroit	4.775	4.775	4.775	4.55	3.71
Sheets, Galv., Pittsburgh	5.075	5.075	5.075	4.80	3.95
Strip, H.R., Pitts.	3.975-4.225	3.975-4.225	3.975-4.225	3.75-4.00	3.05
Strip, H.R., Chicago	3.725	3.725	3.725	3.50	2.80
Strip, C.R., Pittsburgh	5.10-5.80	5.10-5.80	5.10-5.80	4.65-5.35	3.80
Strip, C.R., Chicago	5.35	5.35	5.35	4.90	3.65
Strip, C.R., Detroit	5.30-6.05	5.30-6.05	5.30-6.05	4.85-5.60	3.71
Wire, Basic, Pitts.	5.475-5.225	5.475-5.225	5.475-5.225	4.85-5.10	3.775
Nails, Wire, Pittsburgh	6.35	6.35	6.35	5.90-6.20	5.20
Tin plate, box, Pittsburgh	$8.95	$8.95	$8.95	$8.70	$6.70
SEMIFINISHED					
Billets, forging, Pitts. (NT)	$70.50	$70.50	$70.50	$66.00	$54.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts.	4.425	4.425	4.425	4.10-.30	3.175
PIG IRON, Gross Ton					
Bessemer, Pitts.	$55.50	$55.50	$55.50	$53.00	$40.996
Basic, Valley	54.50	54.50	54.50	52.00	39.00
Basic, del. Phila.	59.25	59.25	59.25	56.61	42.004
No. 2 Fdry., Pitts.	55.00	55.00	55.00	52.50	40.496
No. 2 Fdry., Chicago	55.00	55.00	55.00	52.50	39.00
No. 2 Fdry., Valley	55.00	55.00	55.00	52.50	39.50
No. 2 Fdry., del. Phila.	59.75	59.75	59.75	57.11	42.504
No. 2 Fdry., Birm.	51.38	51.38	51.38	48.88	37.88
No. 2 Fdry. (Birm.) del. Cin.	58.93	58.93	58.93	55.49	42.23
Malleable, Valley	55.00	55.00	55.00	52.50	39.50
Malleable, Chicago	55.00	55.00	55.00	52.50	39.50
Charcoal, Lyles, Tenn.	68.50	68.50	68.50	66.00	55.00
Ferromanganese, Etna, Pa.	228.00	228.00	228.00	188.00	151.00*

* F.o.b. cars, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$44.00	$44.00	$44.00	$44.00	$40.25
No. 1 Heavy Melt, E. Pa.	44.50	44.50	43.00	42.50	39.00
No. 1 Heavy Melt, Chicago	41.50	42.75	42.50	42.50	38.00
No. 1 Heavy Melt, Valley	41.75	41.25	41.25	44.00	40.25
No. 1 Heavy Melt, Cleve.	42.00	41.25	41.25	43.00	39.75
No. 1 Heavy Melt, Buffalo	46.00	47.00	45.50	43.00	43.00
Rails, Rerolling, Chicago	55.00	56.00	53.50	52.50	49.50
No. 1 Cast, Chicago	44.00	44.00	44.00	49.00†	69.00

† F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.75	$12.50
Beehive, Fdry. Connlsvl.	17.00	17.00	17.00	17.50	14.875
Oven, Fdry. Chicago	24.50	24.50	24.50	23.00	19.25

PIG IRON

F.o.b. furnace prices as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies on pages 184-185.

PIG IRON, Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$56.50	$57.00	$57.50	$58.00
New York, del.		60.78	61.28	
Newark, del.	59.52	60.02	60.52	61.02
Philadelphia, del.	59.25	59.75	60.25	60.75
Birmingham District				
Alabama City,Ala. B2	50.88	51.38		
Birmingham B2	50.88	51.38		
Birmingham S8		51.38		
Woodward,Ala. W15	50.88	51.38		
Cincinnati, del.		58.93		
Buffalo District				
Buffalo R2	54.50	55.00	55.50	
Buffalo H1	54.50	55.00	55.50	
Tonawanda,N.Y. W12	54.50	55.00	55.50	
No.Tonawanda,N.Y. T9		55.00	55.50	
Boston, del.	63.15	63.65	64.15	
Rochester,N.Y., del.	57.52	58.02	58.52	
Syracuse,N.Y., del.	58.62	59.12	59.62	
Chicago District				
Chicago I-3	54.50	55.00	55.00	55.50
Gary,Ind. U5	54.50		55.00	
Indiana Harbor,Ind. I-2	54.50		55.00	
So.Chicago,Ill. W14	54.50	55.00	55.00	
So.Chicago,Ill. Y1	54.50	55.00	55.00	
So.Chicago,Ill. U5	54.50		55.00	55.50
Milwaukee, del.	56.67	57.17	57.17	57.67
Muskegon,Mich., del.		61.30	61.30	
Cleveland District				
Cleveland A7	54.50	55.00	55.00	55.50
Cleveland R2	54.50	55.00	55.00	
Akron,O., del. from Cleve.	57.11	57.61	57.61	58.11
Lorain, O. N2	54.50			55.50
Duluth I-3			55.00	
Erie,Pa. I-3	54.50	55.00	55.00	55.50
Everett,Mass. E1		59.50	60.00	
Fontana,Calif. K1	60.50	61.00		
GraniteCity,Ill. G4	56.40	56.90	57.40	
St. Louis, del. (Inc. tax)	57.15	57.65	58.15	
Ironton,Utah C11	54.50	55.00		
Geneva,Utah C11	54.50	55.00		
LoneStar, Tex. L6	56.50	*51.00	51.00	
Minnequa,Colo. C10	56.50	57.50	57.50	
Rockwood,Tenn. T2			58.50	
Pittsburgh District				
Neville Island,Pa. P6		55.00	55.00	55.50
Pitts.,N.&S. sides, Ambridge				
Aliquippa, del.		56.37	56.37	56.87
McKeesRocks, del.		56.01	56.01	56.54
Lawrenceville, Homestead,				
Wilmerding, Monaca, del.		56.66	56.66	57.16
Verona, Trafford, del.		57.19	57.19	57.69
Brackenridge del.		57.45	57.45	57.95
Bessemer,Pa. U5	54.50		55.00	55.50
Clairton,Rankin,So.Duquesne,Pa. U5	54.50			
McKeesport,Pa. N3	54.50			55.50
Monessen,Pa. P7	56.50			
Sharpsville,Pa. S6			55.00	55.50
Steelton,Pa. B2	56.50	57.00	57.50	58.00
Swedeland,Pa. A3	58.50	59.00	59.50	60.00
Toledo,O. I-3	54.50	55.00	55.00	55.50
Cincinnati, del.	59.97	60.47		
Troy,N.Y. R2	56.50	57.00	57.50	58.00
Youngstown District				
Hubbard,O. Y1	54.50	55.00	55.00	
Youngstown Y1	54.50	55.00	55.00	
Youngstown U5	54.50			55.50
Mansfield,O., del.	59.15	59.65	59.65	60.15

*Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00% Si.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50%, no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton
(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson,O. G2, J1	$65.50
Buffalo H1	66.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton
(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls,N.Y. P15	$91.00
Keokuk,Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk,Ill. & Fdry. 12½ lb pigletts 16% Si, frt. allowed K2	93.50
Wenatchee, Wash., Ill. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton
(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$68.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$59.50
Steelton,Pa. B2	62.50
Philadelphia, delivered	66.05
Troy,N.Y. R2	62.50

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NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 30.00c-23.00c, Conn. Valley; Lake 32.25 delivered, nom.; foreign electrolytic, del. 32.00c-26.50c.

Brass Ingots: 85-5-5-5 (No. 115) 29.50c; 88-10-2 (No. 215) 41.75c; 80-10-10 (No. 305) 35.00c; No. 1 yellow (No. 405) 24.00c.

Zinc: Prime western 11.00c; brass special 11.25c, intermediate 11.50c; East St. Louis; high grade 12.35c, and special high grade 12.50c delivered.

Lead: Common 12.80c; chemical 12.90c; corroding, 12.90c; St. Louis.

Primary Aluminum: 99% plus, ingots 20.50c, pigs 19.50c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 24.00-24.75; No. 12 foundry alloy (No. 2 grade) 22.00-23.50; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.00-26.00; grades 2, 23.25-24.50; grade 3, 22.50-23.50; grade 4, 21.50-22.50.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 27.00c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt RFC, 121.50c; outside market, 110.50c, nom.

Antimony: American 99-99.8% and over but not meeting specifications below 34.50c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 35.00c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 60.00c; 25-lb pigs, 62.65c; "XX" nickel shot, 63.65c; "F" nickel shot or ingots, for addition to cast iron, 60.00c. Prices include import duty.

Mercury: Open market, spot, New York, $199-$203, per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $37.72 per lb of contained beryllium, f.o.b. Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2 del; special or patented shapes $2.15.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 85.25c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $23-$24 per troy ounce.

Iridium: $175-$185 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Cents per pound, f.o.b. mill, effective Apr. 1, 1953. Listings are lowest quotations.)

Sheet: Copper 50.48; yellow brass 42.87; commercial bronze, 95% 49.89; 90% 48.76; red brass, 85% 47.11; 80% 45.99; best quality, 44.43; nickel silver, 18% 59.84; phosphor-bronze grade A, 5% 70.50.

Rod: Copper, hot-rolled 46.83; cold-drawn 48.08; yellow brass free cutting, 36.68; commercial bronze 95% 49.58; 90% 48.45; red brass 85% 46.80; 80% 45.68.

Seamless Tubing: Copper 50.42; yellow brass 45.78; commercial bronze, 90% 51.32; red brass, 85% 49.92.

Wire: Yellow brass 43.16; commercial bronze, 95% 50.18; 90% 49.05; red brass, 85% 47.10; 80% 46.28; best quality brass, 44.72.

(Base prices, effective Apr. 1, 1953)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 37.46; 30,000 lb lots, 37.58; l.c.l. 38.08. Weatherproof, 100,000 lb, 37.85; 30,000 lb, 38.10; l.c.l. 38.60. Magnet wire del., 15,000 lb or more 43.93; l.c.l., 44.68.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders. Effective Jan. 22, 1953.)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circlet Base
0.249-0.136	12-48	32.9	...	...
0.135-0.096	12-48	33.4	...	...
0.095-0.077	12-48	34.1	31.8	36.3
0.076-0.061	12-48	34.7	32.0	36.5
0.060-0.048	12-48	35.0	32.2	36.8
0.047-0.038	12-48	35.5	32.6	37.1
0.037-0.030	12-48	35.9	33.0	37.8
0.029-0.024	12-48	36.5	33.3	38.3
0.023-0.019	12-36	37.1	34.0	39.0
0.018-0.017	12-36	37.9	34.6	39.9
0.016-0.015	12-36	38.8	35.4	41.1
0.014	12-24	39.8	36.4	42.4
0.013-0.012	12-24	40.9	37.1	43.4
0.011	12-24	41.9	38.3	45.0
0.010-0.0095	12-24	43.1	39.4	46.6
0.009-0.0085	12-24	44.3	40.7	48.5
0.008-0.0075	12-24	45.8	41.9	50.3
0.007	12-18	47.3	43.4	52.6
0.006	12-18	48.9	44.8	57.6

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	Round— 17S-T4	Hexagonal 17S-T4
0.125	56.8	...
0.156-0.188	48.0	...
0.219-0.313	45.3	...
0.375	43.7	52.4
0.406	43.7	...
0.438	43.7	52.4
0.469	43.7	...
0.500	43.7	52.4
0.531	43.7	...
0.563	43.7	49.2
0.594	43.7	...
0.625	43.7	49.2
0.688	43.7	49.2
0.750-1.000	42.6	46.4
1.063	42.6	44.8
1.125-1.500	41.0	44.8
1.563	40.5	...
1.625	39.8	43.2
1.688-2.000	39.8	...

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $18.00 per cwt; add 50c cwt 100 sq ft to 140 sq ft. Pipe: Full coils $18.00 per cwt. Traps and bends: List prices plus 43%.

ZINC

Sheets 23.00c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 19.50-20.50c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 20.75-21.75c; over 12-in., 20.75-21.75c.

"A" NICKEL

(Base prices f.o.b. mill, effective Mar. 9, 1953) Sheets, cold-rolled 86.50c. Strip, cold-rolled 92.50c. Rods and shapes, 82.50c. Plates, 84.50c. Seamless tubes 115.50c.

MONEL

(Base prices f.o.b. mill, effective Mar. 9, 1953) Sheets, cold-rolled 67.50c. Strip, cold-rolled 70.50c. Rods and shapes, 65.50c. Plates 66.50c. Seamless tubes, 100.50c. Shot and blocks, 57.00c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb 58.00c-65.00c; 25 to 99 lb, 48.00c-55.00c; 100 lb to 5000 lb, 44.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 42.18c; oval 41.68c.

Nickel Anodes: Rolled, oval, carbonized, carloads 81.00c; 5000 to 20,000 lb, 83.00c; 500 to 4999 lb, 85.00c; 1 to 499 lb, 89.00c, f.o.b. Cleveland.

Nickel Chloride: In 100 lb bags; 10,000 lb and over, 37.00c; 5000 to 9999 lb, 38.00c; 400 to 4999 lb, 40.00c; 300 lb, 42.00c; 200 lb, 43.00c; 100 lb, 45.00c, f.o.b. Cleveland.

Sodium Stannate: 25 lb cans only, less than 100 lb to consumers $1.10 per lb; 100 or 350 lb drums only, 100 to 600 lb 71.60c; 700 to 1900 lb, 69c; 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers. Based on $1.215 tin.

Tin Anodes: Bar, 1000 lb and over, $1.42; 500 to 999 lb, $1.425; 200 to 499 lb, $1.43; less than 200 lb, $1.445. Freight allowed east of Mississippi and north of Ohio and Potomac. Based on $1.215 tin.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c, 10 or more drums, 52.30c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11; more than 2000 lb, $1.09. Freight allowed east of Mississippi and north of Ohio and Potomac rivers. Based on $1.215 tin.

Stannous Chloride (Anhydrous): In 400 lb bbl, $1.25; 100 lb kegs $1.26, f.o.b. Carteret, N. J., freight allowed on 100 lb or more. Based on $1.215 tin.

Scrap Metals

Brass Mill Allowances

(Prices in cents per pound for less than 20,000 pounds, f.o.b. shipping point; on lots over 20,000 pounds at one time, of any or all kinds of scrap, add 1 cent per pound. Prices effective Apr. 1, 1953)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	28.625	28.625	27.875
Yellow Brass	24.375	24.125	19.625
Commercial Bronze			
95%	27.250	27.000	26.500
90%	26.125	25.875	25.375
Red Brass			
85%	25.125	24.875	24.375
80%	24.125	23.875	23.375
Best Quality (71-80%)	22.500	22.250	21.750
Muntz metal	20.000	19.750	19.250
Nickel silver, 10%	25.250	25.000	12.625
Phos. Bronze, A	30.625	30.375	29.375
Naval Brass	20.000	19.750	19.250
Manganese Bronze	20.000	19.750	19.250

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 26.50-27.25c; No. 2 copper 25.00-25.25c; light copper 23.50-23.75c; refinery brass (60% copper) per dry copper content 23.00, nom.

INGOT MAKERS' COPPER AND BRASS SCRAP BUYING PRICES

(Carlots, delivered)

No. 1 copper, nom. 25.50c; No. 2 copper, nom. 23.50c; light copper, nom. 21.50c; No. 1 composition borings, 22.00c; No. 1 composition solids, 22.00-22.50c; radiators, 16.00-16.50c; heavy yellow brass solids, 16.50c; yellow brass turnings, 16.00c.

SMELTERS' BUYING PRICES FOR SCRAP ALUMINUM

(Carlots, delivered)

28 aluminum clippings, 16.00-17.00c; mixed clippings, 15.00-15.50c; old aluminum sheet, 13.00-14.00c; old aluminum cast, 13.50-14.50c; borings and turnings 13.50-15.00c.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 24.00-24.50; No. 2 22.00-22.50; light copper 20.00-20.50; No. 1 composition red brass 19.00; No. 1 composition turnings 18.50; mixed brass turnings 13.50; new brass clippings 19.50; No. 1 brass rod turnings 17.50; light brass 12.50; heavy yellow brass 14.50; new brass rod ends 17.50; auto radiators, unsweated 15.00; cocks and faucets 17.00; brass pipe 17.50.

Aluminum: Clippings 28 13.00; old sheets 10.00; crankcase 10.00; borings and turnings 8.00; pistons and struts 6.50.

Tin: No. 1 pewter 65.00-70.00; block tin pipe 90.00-100.00; No. 1 babbitt 56.00-60.00.

Lead: Heavy 9.75-10.25; battery plates 5.00-5.25; linotype and stereotype 11.50-12.00; electrotype 10.25-10.50; mixed babbitt 13.00-13.75.

Zinc: Old zinc, 5.00; new die cast scrap, 5.00; old die cast scrap, 4.00.

Nickel: Sheets and clips 58.00-60.00; rolled anodes 58.00-60.00; turnings 58.00-60.00; rod ends 58.00-60.00.

Monel: Clippings 33.00; old sheet 30.00; turnings 25.00; rods 33.00.

DAILY PRICE RECORD

1953	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Apr. 9	30.00-33.00	12.80	11.00	110.50-121.50	20.50	34.50	60.00	85.25
Apr. 7-8	30.00-33.00	12.80	11.00	116.25-121.50	20.50	34.50	60.00	85.25
Apr. 6	30.00-33.00	13.30	11.00	116.25-121.50	20.50	34.50	60.00	85.25
Apr. 2-4	30.00-34.50	13.30	11.00	116.50-121.50	20.50	34.50	60.00	85.25
Apr. 1	30.00-34.50	13.30	11.00	118.50-121.50	20.50	34.50	60.00	85.25
Mar. 25-31	27.50-34.50	13.30	11.00	121.50	20.50	34.50	60.00	85.25
Mar. 12-24	27.50-34.00	13.30	11.00	121.50	20.50	34.50	60.00	85.25
Mar. 9-11	27.50-33.00	13.30	11.00	121.50	20.50	34.50	60.00	85.25
Mar. 2-6	27.50-32.00	13.30	11.00	121.50	20.50	34.50	60.00	85.25
Feb. 25-28	27.50-28.50	13.30	11.25	121.50	20.50	34.50	60.00	85.25
Feb. 3-24	24.50	13.30	11.50	121.50	20.50	34.50	60.00	85.25
Feb. 2	24.50	13.30	12.00	121.50	20.50	34.50	60.00	85.25
Mar. 1953 Avg.	30.51	13.30	11.00	121.50	20.50	34.50	60.00	85.25
Feb. 1953 Avg.	25.136	13.30	11.431	121.50	20.50	34.50	60.00	85.25
Apr. 1952 Avg.	24.50	18.723	13.50	121.50	13.60	49.077	56.50	88.00

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9% base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

The Metal Market

Improved possibilities of peace in Korea last week precipitated price slides in some of the metals, notably lead, tin and secondary aluminum

CRACKS IN the market structure are beginning to spread with the cold war's spring thaw. They could widen into severe breaks if present trends continue, though there's nothing like panic in the wind.

Peace overtures have had profound effect on the thinking of those dealing with metals. They reason that a less pressing need for defense goods will mean a slowdown in demand for metals. This thinking is translated into hesitant buying and weaker prices in U. S. marts, despite strong and unchecked consumpton at record rates.

No Blanket Decline—While signs of deterioration are growing, they refer to individual metals rather than the entire market. One explanation: The inevitable shakeout is being accelerated. Adverse effects are being felt by lead, zinc, tin, and to a lesser degree by copper, secondary aluminum and scrap of all kinds.

Sharpest tumble has come in tin, which dropped over ten cents in less than a week and isn't likely to stop until it's below the dollar mark. Some authorities expect it would keep falling to near its pre-Korea level of 78 cents if RFC buying-selling functions and the stockpile weren't such dominant factors.

Surprise—Lead gave the market a strong jolt. Everyone was looking for steady or even higher prices, but the London Metal Exchange gave a different cue. When the spread between U. S. and domestic quotations goes above 2 cents, U. S. sellers have to trim sail or risk being swamped by foreign metal.

Last week, with demand on the upgrade, scrap tight and users beginning to believe the time ripe to rebuild inventories, London caution sent prices down. U. S. sellers followed with a half-cent cut to a basis of 13.00 cents, New York. Lead products also dropped by a half-cent. Buyers promptly decided to hold up orders and weather out the storm. Producers remain confident that demand will bring the price back up.

Zinc Wobbly—Zinc is usually sympathetic to lead changes, but prices didn't move immediately. No one will put money on it holding firm, however. Demand is excellent, particularly for high grades, but imports and London shifts have hurt. Prime western is still the key to zinc's price moves; temporary shortages in die casting grades are looked for, but they won't have much effect on the general price level.

Another slight realignment came in copper, where domestic price range narrowed to a 30-33 per cent bracket as a custom smelter sliced 1.5 cents from its quotations. The tin-lead-zinc axis of weakness cut into copper buying too, and users are beginning to play the waiting game. Some foreign copper for May delivery at 32 cents and offers at 33 cents find a surprising number of upturned noses. End of allocation control, common knowledge for weeks, was to be announced officially over the weekend. Brass and bronze ingot market is exceptionally soft, with price reductions expected at any time.

Secondary Aluminum Slips

Remelt aluminum ingots are also falling in price as the scrap market softens. Secondary ingots are off 0.5 to 1 cent, scrap 1 to 1.5 cents. In primary aluminum, offerings of quick delivery on foreign ingots and sheets are common, but business isn't as strong as might be expected. Canadian, British, French, Italian and Norwegian mills are reported seeking more business here.

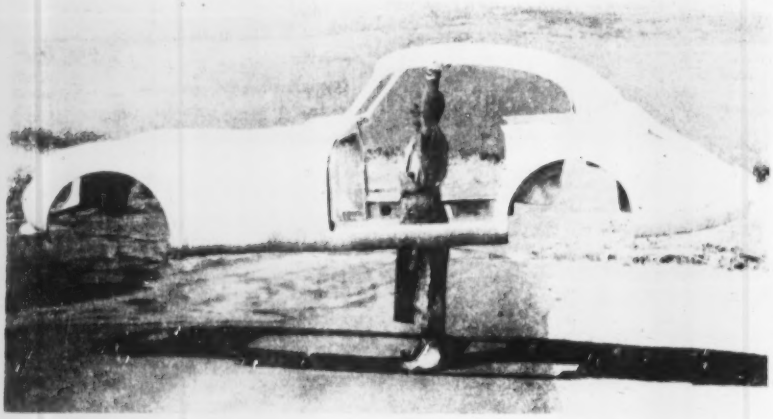
U. S. primary production set a February record at 92,649 tons and an all-time daily high with an average output of 3300 tons, reports the Aluminum Association. The month showed a gain over year-ago figures of 25 per cent in primary turnout and a significant 39 per cent greater total in sheet and plate shipments.

Nippon Nickel Available

If you're hard up for nickel—and who isn't these days—here's a bit of good news for a change. Over 500 metric tons of Japanese metal is on the market now, and it can be used without charging against allocations. NPA points out that end-use controls will apply to any metal bought. Shipments came from New Caledonia via Japan.

Magnesium Plates Offered

Commercial magnesium plates weighing 190 pounds are being offered by Brooks & Perkins Inc., Detroit, with 10-week delivery from its Livonia, Mich., mill. Hot-rolled of AZ 31 alloy, plates measuring 0.265 x 60 x 186 in. were displayed by the company at the International Magnesium exposition in Washington. Base price on widths to 48 in. is 53 cents, with quantity, shearing and packing extras added. Typical physicals are: Ultimate tensile strength 35,000 psi, tensile yield strength 18,000 psi, elongation 16 per cent in 2-in. Plate from 1 to 3/16 in. is rolled from 4-in. slabs in one heat. Cast slab weighing 300 pounds is rolled as it comes from mold. Finished slab after heating and scalping is 250 pounds.



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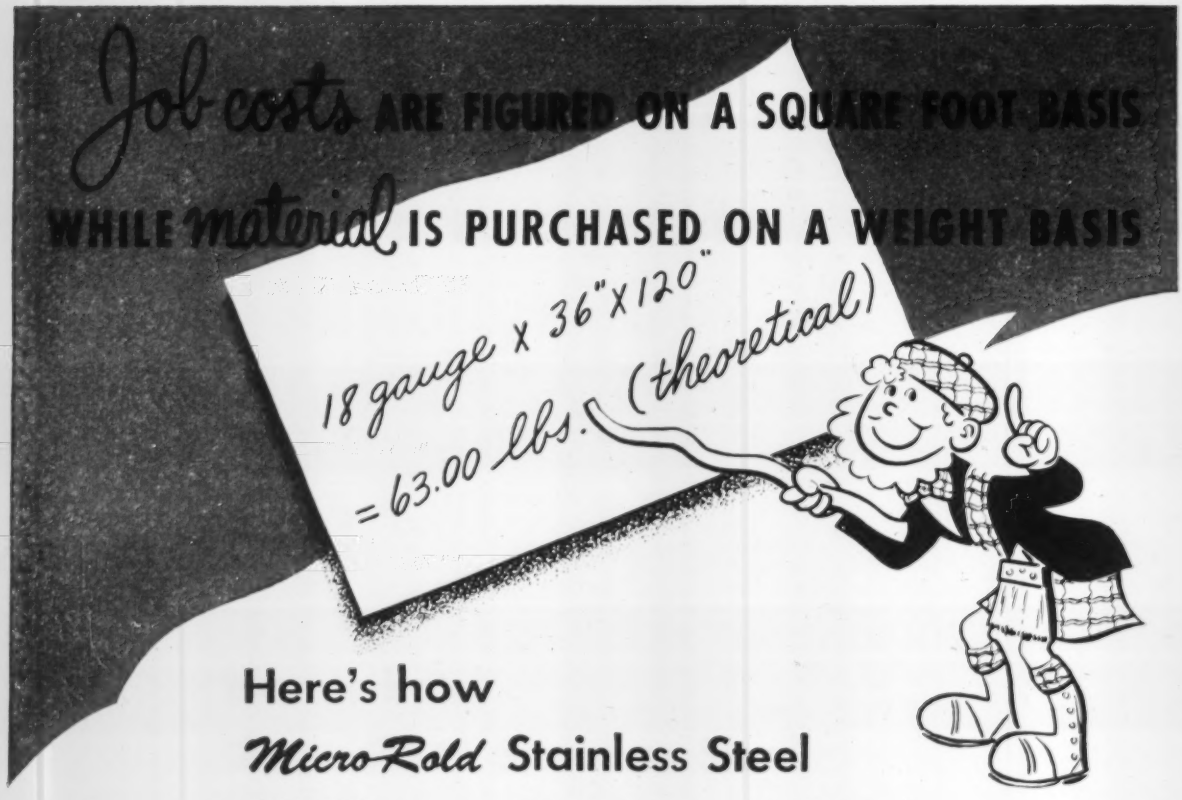
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CORPORATION

WASHINGTON, PENNSYLVANIA

Sheetmakers Booking for Third Quarter

Expected substantial carryovers from second quarter seen limiting new business. Producers accepting commitments cautiously, some on month-to-month basis

Sheet and Strip Prices, Page 169 & 172

Philadelphia — Sheet demand continues at high pitch. This applies to all major grades except galvanized, and includes some of the minor grades, such as electrical sheets, enameling stock and stainless. Most mills are booking some tonnage for third quarter in addition to high-rated government work.

Cleveland — Although sheetmakers have opened their books for third quarter some will not have much open tonnage to offer customers for the period. From all indications carryover orders from second quarter will be heavy and expectations are, based on current demand pressure, the overflow from third to fourth quarter will be similarly large. This promises to be the case especially with the larger producers. Should the continuous mills be relieved of the burden of producing light plates, seen as an early possibility, some relief in tight sheet supply will be afforded, but it will provide only a partial solution. Automotive and appliance demand is outstanding, but all lines of consumption are figuring actively in the current pressure on the market.

Boston — Silicon sheets notably cold-rolled in coils, will be in limited supply for July. Current tentative schedules for carbon sheets next quarter also point to some reductions in allocations, notably if automotive buying holds up. Major shortage in cold-rolled sheets is due chiefly to heavy buying for automotive account, including parts suppliers. Most producers want to clean up CMP tonnage by June 30. If successful, some open or marginal tonnage will go into next quarter. Allotments to converters, strip in this area, continue beyond June 30.

New York—Sheet sellers are extending commitments now that most of them have opened books for third quarter or for at least the first month of the period. Those who have opened beyond July, however, have only extended their commitments lightly, as carryovers, especially in the hot and cold grades, are expected to be substantial. One producer says his carryover may account for between two or three weeks production of hot and cold-rolled sheets.

Cincinnati — Pipelines to the household appliance industry show some signs of filling up, but there are no indications that buyers want to hold back on orders. Some mills report their books are closed for third quarter. Those still working on third quarter allotments will have a carry-over of orders from second quarter. Manufacturers are endeavoring to place more conversion business. Mills are reported about 60 days behind on commitments.

Chicago—Nothing in the sheet picture as yet gives indication of lessening demand in the last half of the year. Mills are about to notify civilian goods manufacturers as to their third quarter quotas and it is a foregone conclusion that many people are going to be made unhappy over the fact that tonnages will show little if any improvement over second quarter.

St. Louis—Galvanized sheets continue in softer demand, and mills are beginning to doubt the lag is wholly seasonal. Farm building is not registering its usual volume pickup. Cold-rolled sheet output is down, due to a shiftover to new slab mill equipment at Granite City Steel Co.

Index of Prices

Bars	168 & 169
Clad Steels	173
Coal Chemicals	171
Coke	171
Comparison of Prices	148
Composite Market Averages	148
Electrodes	173
Fasteners	173
Ferroalloys	164
Fluorspar	171
Metal Powders	173
Nonferrous Metals	149
Ores	171
Pig Iron	148
Plates	168
Rails	172
Refractories	171
Scrap	176
Semifinished Steel Products	168
Sheets	169
Stainless Steel	173
Strip	169 & 172
Structurals	168
Tin Mill Products	169
Tool Steels	172
Track Material	172
Tubular Goods	173
Warehouse Steel Products	154
Wire & Wire Products	172

Tubular Goods . . .

Tubular Goods Prices, Page 173

Pittsburgh — Should plastic pipe ever find a market that represents a big threat to steel, producers in this district will be surprised. Steel pipe producers are keeping an eye on developments (U. S. Steel has installed a small extrusion press at McKeesport for experimental purposes), and they agree there is a market for plastic pipe. The possibility of plastic coated steel pipe is being investigated and steel producers hope it will be the answer to any threatening competition from plastic pipe.

Boston Prices on buttweld steel pipe at the distributor level have eased further. Stocks of this grade are balanced and more jobbers are not taking full allotments. Increased difficulty also is experienced in directing turned-down allocations into direct shipments. Light-walled welded tubing also is soft, but in stainless grades is active.

Philadelphia — Buttweld pipe stocks are building up. Distributors are not cancelling their regular mill quotas, but they are in some cases easing discounts in an effort to move tonnage.

Los Angeles Trade observers forecast tighter supply of oil country tubular goods in third quarter and balance between supply and demand by fourth quarter.

Seattle Demand for pipe is improving. Several sizable projects involving both cast iron and steel pipe are up for bids. Cast iron pipe deliveries are normal, but as a rule buyers ask for alternative bids. Cast iron pipe awards in one recent week exceeded 500 tons, and 800 tons are involved in bids closing later this month. Walla Walla, Wash., is asking figures on a large steel water pipe tonnage.

Industrial Fastener Prices Are Increased

(Bolt and Nut Prices, Page 173, are those in effect prior to latest changes)

New York Bolt, nut and rivet prices are being advanced 2 to 3 per cent on the average. Some long bolts are being increased around 6 per cent. Even with this increase, some producers still are absorbing about 50 per cent of their cost increases since January 1951, which since then are up about 10 per cent. The last increase in fastener prices was on Nov. 12, 1952, a rise of 2.2 per cent effected by way of a pass-through permitted by OPS and based on the lowest estimate of raw material cost increases in the industry, not including labor. One maker estimates its labor costs are up as much as 32 cents an hour since early 1951.

Cleveland General price increase averaging 2 to 4.5 per cent is impending on some industrial fasteners. One large Pittsburgh producer of bolts and nuts increased prices effective Apr. 7, and other makers indicated they planned to issue new schedules shortly. A Cleveland rivet maker increased its prices on large and small rivets, effective Apr. 3, now quoting large rivets $8.50 per 100 pounds, and small rivets at 30 per cent off list.

The increase in prices is effected to offset higher wage and other costs which were not covered by the increases permitted last fall by the Office of Price Stabilization to offset increased steel costs. In the case of one bolt and nut maker here it just completed a new wage agreement which grants its workers another 7½ cents per hour increase.

Current demand for fasteners is strong. First quarter volume was heavy, but due to high costs and frozen prices profit margins were slim. Steel supply continues tight though improved over that several months back.

Pittsburgh — Prices are being increased on bolts and nuts by producers here. Meanwhile, an anticipated stronger demand has not yet developed. Customers are not showing much interest in long term commitments. General agreement seems to be that sentiment has been softened by speculation on the Korean truce.

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Cincinnati, San Francisco, St. Paul, 15 cents.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Baltimore	5.81	7.17	8.27	6.42	...	6.41	7.18	11.27	6.47	6.47	7.70
Boston	6.51	7.35	8.39	6.55	...	6.42	7.49	12.37	6.56	6.80	7.98
Buffalo	5.80	6.65	8.31	6.21	...	5.90	6.95	11.07	6.08	6.30	7.67
Birmingham	5.80	6.65	7.70¹	5.80	...	5.80	7.85	...	5.95	6.10	8.15
Chicago	5.80	6.65	7.90	5.83	...	5.83	6.80	10.65	5.95	6.00	7.18
Cincinnati	6.13	6.72	8.21	6.14	...	6.13	7.16	10.97	6.42	6.47	7.60
Cleveland	5.80	6.65	8.04	6.00	...	5.89	6.90	10.79	6.28	6.17	7.51
Detroit	6.23	6.46	8.44	6.08	7.495	6.12	7.10	10.92	6.42	6.47	7.52
Houston	6.74	...	8.67	6.89	...	6.98	...	...	6.82	6.78	8.16
JerseyCity,N.J.	6.26	7.27	8.32	6.56	...	6.59	7.53	9.54	6.39	6.60	8.01
Los Angeles	6.60	8.45	9.50	6.75	11.20	6.60	8.65	12.05	6.60	6.70	8.90
Milwaukee	5.97	6.82	8.07	6.00	...	6.00	7.07	10.82	6.12	6.17	7.35
Moline, Ill.	6.16	7.00	8.30	6.19	...	6.18	6.91	...	6.30	6.30	...
New York	6.26	7.37	8.32	6.56	...	6.69	7.63	11.14	6.49	6.70	8.11
Norfolk, Va.	7.60	...	...	...	...	6.44	8.70	...	7.25	6.64	7.33
Philadelphia	6.16	7.18	7.70	6.50	8.30	6.47	7.50	10.89	6.22	6.29	7.42
Pittsburgh	5.80	6.65	7.90	5.97	...	5.83	6.90	10.65	5.95	6.00	7.18
Portland, Oreg.	7.80	9.05	9.75	7.60	...	7.35	9.40	...	7.30	7.30	9.25
Richmond, Va.	6.14	6.95	8.68	6.53	...	6.30	7.63	...	6.58	6.68	7.80
St. Louis	6.10	6.94	8.20	6.14	...	6.13	7.20	10.95	6.35	6.35	7.58
St. Paul	6.47	7.31	8.61	6.50	...	6.49	7.32	...	6.61	6.61	7.84
San Francisco	6.85	8.15	9.45	6.70	...	6.60	8.65	12.00	6.45	6.70	8.85
Seattle-Tacoma	7.36	8.24	9.40	7.40	...	7.08	9.37	12.00	6.83	7.19	9.10
Spokane (city)	7.80	9.40	10.15	7.15	...	7.10	9.70	11.90	7.00	7.10	9.15
Washington	6.31	7.61	8.90	6.89	...	6.90	8.03	...	6.93	6.95	8.17

Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes 25-cent special bar quality extra; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ²—500 to 1499 lb; ³—1000 to 1999 lb.

Semifinished Steel . . .

Semifinished Prices, Page 168

Pittsburgh — Approximately 100,000 tons of steel ingots were lost by the short-lived strike of Union railroad workers that tied up four plants of U. S. Steel Corp. as well as coal mining operations to the tune of 90,000 tons, and some metalworking industries. Some observers think the loss may cut into plate and structural deliveries. Other producers here feel the loss will be spread out over a greater number of products with the result no one will feel too great a pinch.

Youngstown — U. S. Steel Corp.'s Ohio works and McDonald mills here started closing down last midweek due to a strike of 100 employees of the Youngstown & Northern railroad, a subsidiary serving these plants. Expectations were the shutdown would idle about 10,000 workers and cut off output of about 8000 tons of ingots daily.

Warehouse . . .

Warehouse Prices, Page 154

Pittsburgh — Warehousemen are not complaining about overstocked shelves but they are finding customers are getting more particular. Buying of tighter items, such as bars shapes and structurals, is less aggressive.

Cleveland — Seasonal upswing in demand for the general run of steel products is being reflected in orders coming to district warehouses. Automotive and appliance industry needs figure prominently, but building steel is moving more actively than during the winter months.

Distributors' stocks continue to rise, though they are still unbalanced, chiefly in heavy bars and heavy plates. Loss of production in Pittsburgh recently due to a strike of railroad workers has slowed down warehouse tonnage receipts from that point, but in general incoming shipments have been pretty much on schedule.

Boston — Warehouses with historical relationships with the mills will have to depend on volume from those sources for second quarter. Mill allocations are out after June except for the higher rated military orders against which warehouses can order replacements under priority.

Philadelphia — Warehouse trading this month has started off well. Business will be sustained at the record rate for this year established in March. Inventories are improving.

Baltimore — Warehouses report brisk business, March being the most active month to date this year. Equally good business is expected this month. Inventories are improving, and while still unbalanced, consumers usually can get what they want by shopping around.

Cincinnati — Mill shipments to warehouses are lagging from two to four months. Some orders dated back to last year are expected to be filled this month. March business matched that of the previous month. Demand for hot and cold-rolled sheets, large rounds and tubular goods remains firm. Stocks are out of balance and there is no immediate chance of catching up on sizes and volume shortages.

Chicago — Except for galvanized sheets, which continue easy, steel warehouses here find no convincing developments that supply-demand balance is near at hand. Consumers press hard for all of the products in short supply, such as sheets, bars and plates.

Los Angeles — More steel is on warehouse shelves but distributors' inventories lack popular sizes of hot-rolled and cold-rolled sheets, plates, wide flange beams, and shapes.

Seattle — Warehouse executives expect prices will round off on a supply and demand basis. Under government control bidding was difficult with price changes effective the sixteenth of each month. As an illustration, bars have fluctuated between 7.40 cents and 7.08 cents. The price now is expected to be stabilized at a mean of the two. The same averaging is expected on other items. Demand currently is spotty and while seasonally active is off slightly from a year ago. Some Alaskan public work jobs have been canceled. Items rolled by Pacific Coast mills are in good supply but eastern products continue tight, especially hot-rolled sheets and wide plates. Supply of galvanized sheets is described as ample.

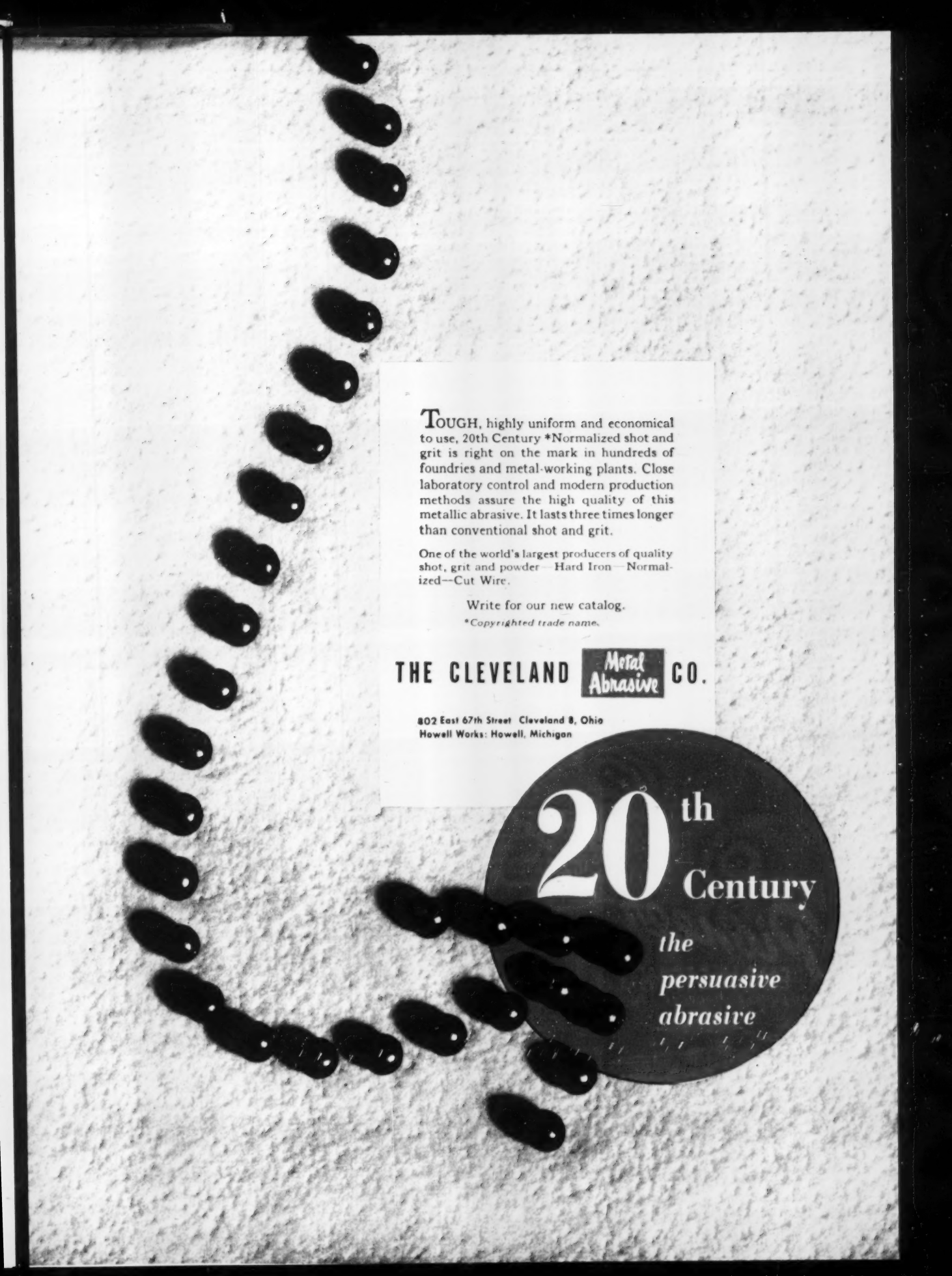
Reinforcing Bars . . .

Reinforcing Bar Prices, Page 168 & 169

Chicago — Demand for reinforcing steel exceeds output, still no job is being held back for lack of material. Prospects are for a heavy volume of road construction in Illinois and Indiana in late spring and summer, which, coupled with a substantial amount of industrial construction, will require barmakers to distribute steel on a quota basis as in the past. Welded fabric is not nearly so tight as bars.

Seattle — Rolling mills here are operating at capacity. While order backlogs were reduced in first quarter, prospects are promising for second quarter as many major projects involving reinforcing bars are expected

(*Turn to page* 156)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Reinforcing Bars . . .

(Continued from page 154)

to be placed soon. Small tonnage inquiries for schools, industrial plants and private construction work are increasing. State highway projects and reclamation requirements will absorb large quantities of bars. Several federal projects have been redesigned, reducing the amount of steel required. A family housing contract at Elmendorf Field, for instance, was awarded on the basis of block walls instead of reinforced concrete.

Los Angeles—California state's proposed 4800-mile highway and freeway construction program costing over $2 billion, under consideration by California State Senate, would almost double current programs.

Structural Shapes . . .

Structural Shape Prices, Page 168

New York—Public work, especially state bridge construction, overshadows all other activity in the local structural market. No sizable jobs have been placed within the last few days, but a number are active, with awards anticipated later this month.

New York—Competition continues strong among smaller fabricators, especially those whose backlogs are not sufficiently extended to give them efficient operation.

Boston—Slow seasonal start in bridge estimating, is partially offset by more building. Including the Bangor-Brewer, Me., span, less than 2500 tons of bridge tonnage is actively on the boards and this also includes 500 tons for a riveted plate girder, Norwich, Conn.

Philadelphia—The Pennsylvania Highway Department has entered the market for structural bridgework for the first time this year. Inquiry includes 1500 tons for a project in York county, bids opening Apr. 24. Bids for two other projects, each involving less than 100 tons, will be opened at that time.

Pittsburgh—Demand from railroad car builders has subsided considerably from the peak of a month ago, but their place has been taken by smaller structural fabricators. Many small building projects in the Pittsburgh district have been waiting for structural material.

Cleveland—Structural fabricators report a seasonal upswing in building activity with resulting heavier demand for structurals and other building steel items. This first became noticeable in March following a relatively quiet February. Currently, public jobs, such as schools, feature but small industrial work also is before the trade.

Baltimore—Except for the 4000-ton bridge in Washington for the District of Columbia Commission, on which bids closed Apr. 9, no outstanding structural work is being figured in this district. Nevertheless, considerable small work of miscellaneous character is keeping local fabricating shops active. Some fabricators have order backlogs of six months or more.

Birmingham—Ingalls Iron Works Co. has booked a contract for 5500 tons of structurals for the 22-story southeastern regional office of the

(Turn to page 159)

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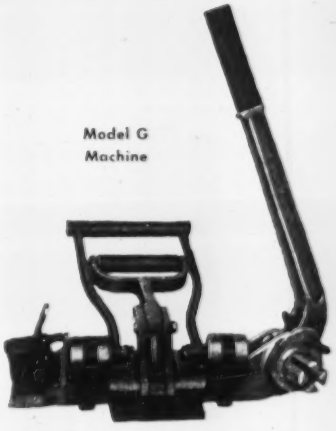

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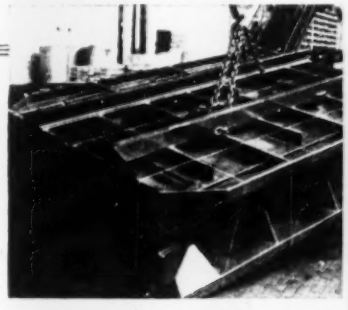
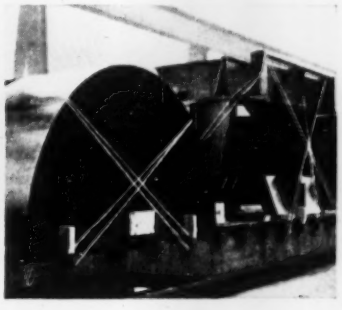
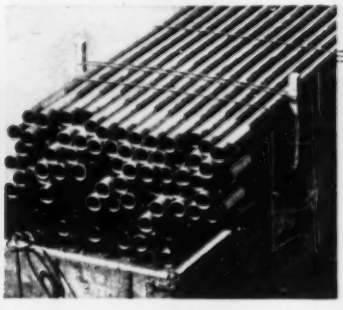
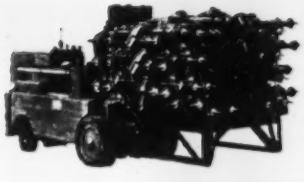






THIS CARLOAD OF PIPE, secured with 8 ga. Gerrard Round Steel Strapping, conforms to Figure 82 of the Association of American Railroads' pamphlet on open cars.



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UNITED STATES STEEL

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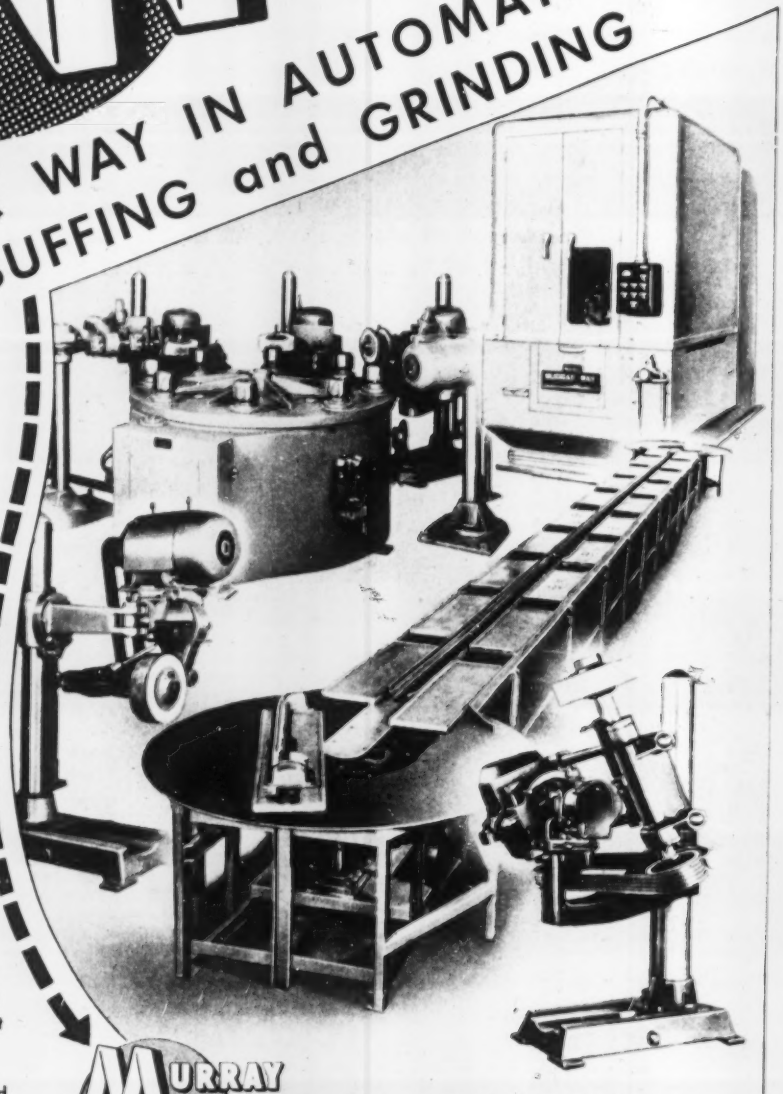

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AUTOMATIC POLISHING, BUFFING, GRINDING EQUIPMENT

Structural Shapes . . .

(Continued from page 156)

Prudential Insurance Co. of America at Jacksonville, Fla. The order represents $1.5 million. The steel will be fabricated here and erected by the Steel Construction Co., an Ingalls affiliate.

Los Angeles—Demand for structurals, sustained by active hospital construction, is stronger. Construction of the $3 million Mount Sinai hospital will start May 1. Construction is underway on the $2 million Daniel Freeman Memorial hospital in Inglewood.

Seattle—Largest structural job pending here involves 3000 tons plus for the proposed Anaconda Aluminum Co. reduction plant at Flathead, Mont. Pacific Car & Foundry Co. last week booked 2400 tons for the Washington state Chehalis river bridge. Local plants were idle recently due to a labor dispute. Demand for shapes indicates an active second quarter.

Steel Bars . . .

Bar Prices, Page 168 & 169

Boston—Lower mill allotments to commercial consumers for third quarter are due in some instances to the fact producers will fail to meet higher second quarter goals. Substantial carryovers are already a problem in lining up April-June tonnage. Books are open for third quarter on alloys and carbon, and on a month-to-month basis are filling up for July, tonnage being limited in the larger sizes to what is left after carryovers and set-aside military tonnage. Except for cold-finished, this volume will be small.

New York—The leading producer has been delayed by recent labor difficulties at Pittsburgh, but commercial bar producers generally have opened books for shipment beyond second quarter.

Philadelphia—Most carbon bar producers have opened books for tonnage shipment beyond the current quarter, but they are doing so conservatively.

Pittsburgh—Demand continues to taper for small diameter bars, but there is every indication of tight supply in the large diameters through third quarter. Latest estimates place the increase in defense tonnage for the shell program at 30 per cent. No cutback is expected in event of a Korean war truce.

Cleveland—Barmakers have opened books for third quarter tonnage but they are taking new business conservatively. Actually, heavy carryover is expected from second to third quarter with the result not much relief in tight supply conditions is indicated in the latter period.

Cincinnati—Heat-treated or annealed bars are the biggest bottleneck now. Large diameter bars are in tight supply. Other types have loosened a little. Altogether, the alloy bar situation is not too bad. The inventory position in this line has improved a bit. Carbon bars appear to be making no headway with business holding up and no increase in inventories.

Baltimore—Manufacturers of light

machinery tools and fasteners are continuing to press for bar tonnage. One large maker of portable electric tools reports heavy demand for domestic tool kits, a trend that has been appreciably growing over the past two years, as householders turn increasingly toward doing their own repairs and making minor alterations wherever possible.

Chicago—This week and next civilian bar users will learn from the mills what quotas they will be allowed for third quarter. The news will not be good. Military uses account for over 20 per cent of bar production and the remainder is not enough to match demand from every consuming area.

Plates . . .

Plate Prices, Page 168

Cleveland—Heavy gage plates continue in strong demand with consumers still unable to satisfy all their requirements. Warehouse buyers report heavy plates among the chief items in short supply. On the other hand, light gage plates are steadily increasing in availability and shortages in this particular category are considered temporary. How long this improvement in light plate supply will be in evidence is questionable, however. Some trade authorities think that supply will tighten quickly should the continuous mills now rolling light gage plates reduce their output to a minimum in favor of sheets after government distribution controls, except for military and atomic energy needs, are lifted beginning third quarter.

Pittsburgh—For the length of time it is out of production, the No. 3 open-hearth shop of U.S. Steel Corp. will have a tightening effect on tonnage available in the Pittsburgh district. Largest portion of the tonnage from this works goes into production of heavy plates and structurals. Plate producers are not looking for customers but they would like assurance of a solid market in fourth quarter.

Boston—Procurement for three yards constructing warships, destroyers and submarines has stepped up with some tonnage coming from as far away as southern mills. Producers who opened books for July now are closed out for that month, except for narrow and thin sizes. Straight chromium clad deliveries average eight weeks and nickel-bearing four to five months.

New York—Plate producers are encouraged over the outlook for third quarter. Most sellers believe volume will continue to tax facilities.

Philadelphia—Plate producers are moving conservatively in accepting tonnage for third quarter. Some have opened books for the entire quarter, but others have not opened beyond July. Carryovers must be appraised more accurately and a better idea obtained as to what their rated tonnages are going to amount to.

Seattle—Sizable plate tonnages are involved in a number of air field fuel storage projects in this area and Alaska. These are scheduled for

(*Turn to page* 162)

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Markal Paintstiks are available in a complete line for marking hot surfaces up to 2000° F, cold surfaces as low as—50° F.

Wet, dry, icy, rough or slick surfaces can also be marked. Write for full information on the complete line.

For—Extreme heat 250° F to 1800° F . . . permanent . . . comes off in pickling bath

For—Hot Metal 150° F to 1500° F . . . will not run, char, flow, discolor or peel. Immersion in cold water will not deface.

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For—Metal to be annealed at temperatures up to 1600° F. Marking when cold.

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For—Lumber, wet, dry, green, creosoted or Wolmanized.

Other types are available for special marking requirements; our engineers will make recommendations if you will outline your special problem.

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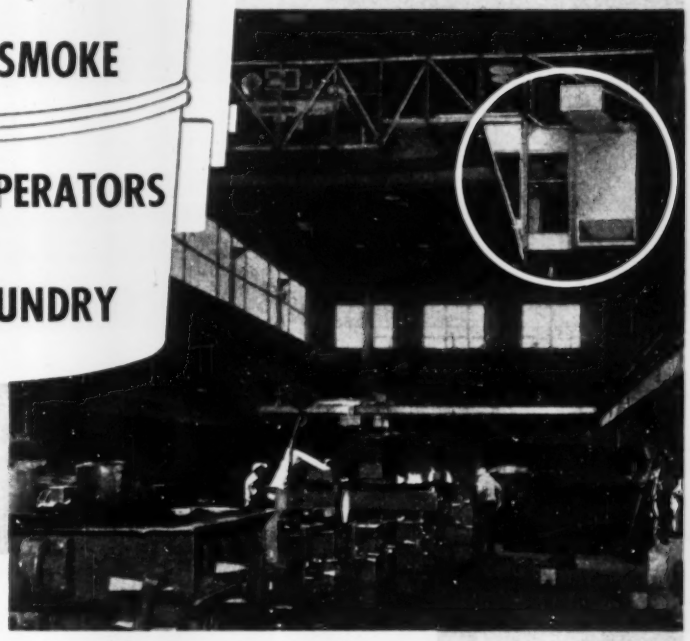

Operations in the foundry at Greenlee Brothers & Company had been hampered by excessive smoke and fumes. Smoke, which resulted from burning of residual oil and flour, and fumes from core ovens made it impossible for crane operators to work at maximum efficiency. Installation of Dravo Crane Cab Conditioners eliminated these intolerable conditions, greatly improving the efficiency and alertness of crane operators while safe-guarding their health.

Dravo Crane Cab Conditioners are ruggedly-constructed ventilating units, fabricated specifically for rough industrial usage and are especially designed for conditions which require fume removal. These units provide a continuous supply of air from which dust and dirt has been removed. Electric strip heaters maintain temperatures of 68° to 72° F. in crane cabs during winter months.

These units can be easily installed vertically, horizontally, or at any angle which space permits. A separate control cabinet allows on-off operations and regulates heat. Dravo Crane Cab Conditioners are also ideal for installation on mobile cranes, pulpits and other equipment operating where similar conditions exist.

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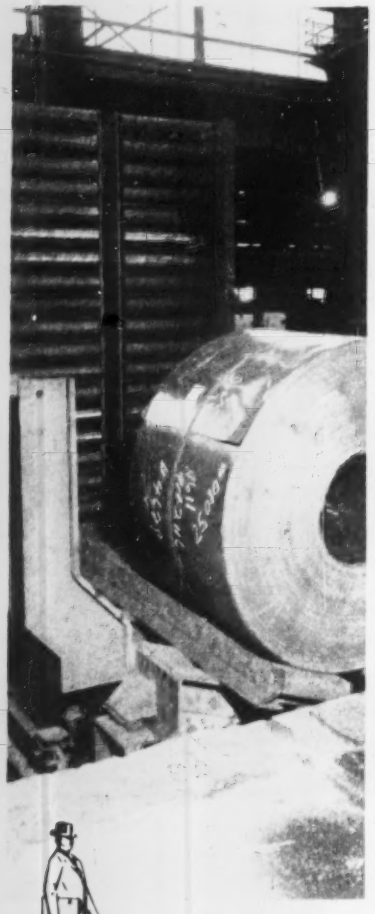

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Plates . . .

(*Continued from page* 160)

early action. Major construction jobs involving plates include a pulp plant under construction at Ward Cove, Alaska, the Scott Paper Co. expansion at Everett, Wash., and an oil refinery installation at Ferndale, Wash., bids in. Also a proposed refinery project at Tacoma is expected to develop shortly.

Tool Steel . . .

Tool Steel Prices, Page 172

New York—Shipments of high speed and tool steel, excluding hollow drill steel, increased in February, according to the American Iron & Steel Institute. Total shipments during the month were 10,046 tons, comparing with 9769 tons in January. In February a year ago shipments were 13,533 tons. In the first two months of this year shipments amounted to 19,815 net tons, a sharp decline compared with the 28,016 tons shipped in the like period of 1952.

Philadelphia—An eastern producer of mine and quarry steel has advanced prices on most grades, effective Apr. 2. Carbon hollow drill was increased to 18.50 cents, base; alloy hollow drill to 21.50 cents; carbon broaching to 14.50 cents; and channeler steel to 14.50 cents. These new prices represent increases of 2 cents in each case. Augur twisted steel was boosted to 32 cents, up 3 cents. Solid drill steel is unchanged at 12 cents.

Wire . . .

Wire Prices, Page 172

Baltimore—Manufacturers wire continues in active demand. In addition, some improvement is noted in merchant wire products trade. Fencing is beginning to move more briskly along with other products required in the farming areas. An interesting trend in the Carolinas is an increase in cattle raising. This movement over recent years has spread from the West and Southwest to the Southeastern states. Florida now is a highly important cattle raising state, and South Carolina and North Carolina are steadily rising in importance in the field.

Boston—Producers of unthreaded cold-headed specialties, 5/16 inch and under, small rivets, including tubular, have converted into orders second quarter tickets, but find the supply of processed wire, mostly in low carbon grades, improving. Deliveries on finished specialties entering into a broad line of consumer goods are 10 to 12 weeks.

New York—Heavy buying by the automobile industry features wire demand, notably valve spring grade. Incoming orders are in excess of shipments which are up. Industrial use of wire specialties is brisk with demand heavier for music wire in formed springs. Second quarter schedules are filled with only scattered openings for unallocated tonnage.

Pittsburgh—Few signs of increased demand for merchant wire products

(*Turn to page* 167)

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22-25% Lanthanum
15-17% Neodymium
8-10% Praseodymium, Terbium, Yttrium, Illinium, Samarium
0.5 to 1.5% Max. Iron

CERIUM STANDARD ALLOY— #2

Analyzing:

30-38% Cerium
32-35% Lanthanum
22-25% Neodymium
7-9% Praseodymium
0.5 to 1.5% Max. Iron

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90% Mischmetal — 10% Magnesium
80% Mischmetal — 20% Magnesium
70% Mischmetal — 30% Magnesium
60% Mischmetal — 40% Magnesium

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STEEL CASTINGS:	Improves castability, ductility and low temperature impact values.
DUCTILE IRON:	Counteracts effect of subversive elements such as titanium, lead, aluminum, etc. Consistently results in improved physicals.
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Write us for further information and literature on any of the above applications or for your specific problems. Your inquiry will receive prompt attention.

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CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL; changes shown in italic

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $85, Palmerton, Pa.; $85, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $225 per gross ton of alloy, c.l. packed $237; gross ton lots, packed, $252; less gross ton lots, packed $269; f.o.b. Sheridan, Pa., Alloy, W. Va., Niagara Falls, N. Y.; Ashtabula, Philo or Marietta, O., Lynchburg, Va. Base price: $227, Johnstown, Pa.; $228, Etna, Pa.; $226, Anaconda, Mont.
Shipment from Pacific Coast warehouses by one seller, add $33 to above prices f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $267; less gross ton lots, $284, f.o.b. Chicago. Add or subtract $2.80 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 0.5c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 96% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Carload, 30c; ton lots, 32c; 250 to 1999 lb, 34c. Premium for hydrogen-removed metal, 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.4c per lb of alloy, carload packed, 12.15c, ton lots 13.95c, less ton 14.05c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l., packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%) Contract, carload, lump, bulk, max. 0.03% C 37.60c per lb contained Cr, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%) Contract, c.l. S M x D, bulk, 26.25c per lb of contained Cr. C.l., packed 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract, carload, packed, S M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 25.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 25.90c per pound of contained chromium plus 12.60c per pound of contained silicon, f.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 26-39%, Al 7-9%, C 0.05% max.) 25.75c per lb of contained silicon plus 16.4c per lb of contained silicon plus aluminum 2" x down, delivered.

Chromium Metal: (Min 97% Cr and 1% Fe) contract carload, 1" x D; packed, max 0.50% C grade, $1.12 per lb of contained chromium, ton lots $1.14, less ton $1.16. Delivered. Spot, add 5c; prices on 0.10 per cent carbon grade, up 4c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c..

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 10.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

SILICON ALLOYS

25-30% **Ferrosilicon:** Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe) c.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 2c to 1999 lb 11.65c, smaller lots 12.15c

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $2.10 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max), $3.20. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%), 10,000 lb W or more, $4.85 per lb of contained W; 2000 lb W to 10,000 lb W, $4.95; less than 2000 lb W, $5.07, f.o.b. Niagara Falls, N. Y.

*Government ceiling prices effective May 7, 1951, f.o.b. Niagara Falls, N. Y., basis.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y. freight allowed same as high-carbon ferrotitanium.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb or Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packed 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max., C 0.4% max). Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton lot 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr, 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe) Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth, Pa., $1.14, in cans; in bags $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

They

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Wire . . .

(*Continued from page* 162)

are reported, but over-all there is nothing to indicate a general seasonal surge in requirements. Demand for high carbon wire continues strong. Customers are currently buying at a greater rate than their needs and will probably have good inventories by third quarter. Manufacturers of low carbon wire report strong demand, although producers are not able to find an outlet for all the tonnage they are turning out.

For 19,830 tons, galvanized steel barbed wire, 100-pound coils, Corps of Engineers, Pittsburgh, has bids; also on 3,054,114 barbed wire posts, two feet, eight inches, to eight feet in length.

Chicago—Some pickup in demand for merchant wire products is taking place in the Midwest, paralleling that which occurred earlier in southern territory. Dealers are expanding their inventories and mills are in position to ship new orders on most items fairly promptly.

Pig Iron . . .

Pig Iron Prices, Page 148

Cleveland—Not much change is in evidence in the merchant pig iron market. The furnaces are disposing of their output, but they are not under pressure. Consumption is heavier than it was some time back, reflecting increased demand for automotive and appliance castings. Considerable surprise is expressed over the fact inquiry for silvery iron has not spurted of late. Although two stacks in southern Ohio producing this grade have been out of production for over a month due to labor trouble, other producers note little pickup in demand on them.

Youngstown—Pittsburgh Coke & Chemical Co. has taken out of blast its Anna blast furnace at Struthers, O. Company officials have not decided whether to reline the stack or let it stand idle for the present. It is reported here that efforts are being made to purchase the site of the furnace for another purpose.

Boston—Foundry pig iron, Everett, Mass., remains unchanged for second quarter at $59.50 furnace. This price holds despite a clause in the extension of pig agreements with customers, July 1, 1952, which change the base price as calculated under schedule B when price control ended Mar. 12.

New York—Little change is noted in the movement of pig iron here. Gray iron shops report no appreciable increase in their requirements, with most still operating at little more than 70 per cent of normal, and inventories substantial. Producers could supply more iron if called upon to do so.

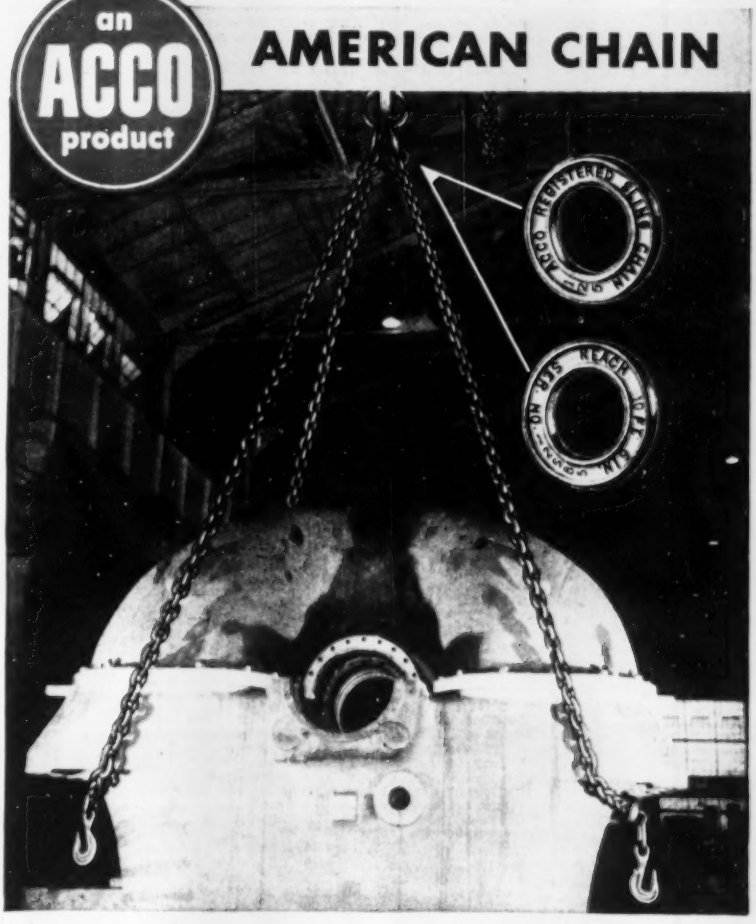
Buffalo—Easier tendencies in other markets are not reflected in the pig iron trade here. Sellers have no difficulty disposing of their current output. Electrical appliances and motor castings makers are taking large tonnages. Heavy vessel shipments of iron are reported. General foundries, however, are having difficulty maintaining full operations.

Philadelphia—There is some talk

(*Turn to page* 175)

an ACCO product

AMERICAN CHAIN



"Why do we use American Chain?"

"For two reasons," said this manufacturer of heavy machinery. "First, we have used American Chain successfully for years. Second, the high strength alloy it is made from permits using smaller diameter chain which is hooked up easily by our men. And the men like the way the grab hooks slip over the links and set themselves securely. I think they just feel safer working with American Chain."

This AMERICAN CHAIN user is referring to our 125 Endweldur alloy steel, heat-treated ACCO Registered sling chain with our series 40 drop-forged grab hooks.

No matter what chains you require, AMERICAN has them and will furnish chains that will last longer . . . and cost less to use. Call your AMERICAN CHAIN distributor today and let him make recommendations. Or write to our York office for Bulletin DH-314.

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American Chain

Semifinished and Finished Steel Products

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on pages 168-169.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ... $81.00
Munhall,Pa. U5 ... 54.00
Seattle S24 ... 75.00

INGOTS, Alloy (NT)
Detroit R7 ... $57.00
Fontana,Calif. K1 ... 83.00
Houston S5 ... 65.00
Midland, Pa. C18 ... 57.00
Munhall, Pa. U5 ... 57.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ... $59.00
ClairtonPa. U5 ... 59.00
Ensley,Ala. T2 ... 59.00
Fairfield, Ala. T2 ... 59.00
Fontana,Calif. K1 ... 78.00
Gary,Ind. U5 ... 59.00
Johnstown,Pa. B2 ... 59.00
Lackawanna,N.Y. B2 ... 59.00
Munhall,Pa. U5 ... 59.00
So.Chicago,Ill. U5 ... 59.00
SoDuquesne,Pa. U5 ... 59.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ... $70.50
Buffalo R2 ... 70.50
Canton,O. R2 ... 70.50
Clairton,Pa. U5 ... 70.50
Cleveland R2 ... 70.50
Conshohocken,Pa. A3 ... 77.50
Detroit R7 ... 73.50
Ensley,Ala. T2 ... 70.50
Fairfield,Ala. T2 ... 70.50
Fontana,Calif. K1 ... 89.50
Gary,Ind. U5 ... 70.50
Geneva,Utah C11 ... 70.50
Houston S5 ... 78.50
Johnstown,Pa. B2 ... 70.50
Lackawanna,N.Y. B2 ... 70.50
LosAngeles B3 ... 89.50
Munhall,Pa. U5 ... 70.50
Seattle B3 ... 89.50
So.Chicago R2,U5,W14 70.50
So.Duquesne,Pa. U5 ... 70.50
So.SanFrancisco B3 ... 89.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ... $76.00
Buffalo R2 ... 76.00
Canton,O. R2 ... 76.00
Canton,O. T7 ... 78.60
Conshohocken,Pa. A3 ... 83.00
Detroit R7 ... 79.00
Fontana,Calif. K1 ... 95.00
Gary,Ind. U5 ... 76.00
Houston S5 ... 84.00
Ind.Harbor,Ind. Y1 ... 76.00
Johnstown,Pa. B2 ... 76.00
Lackawanna,N.Y. B2 ... 76.00
LosAngeles B3 ... 96.00
Massillon,O. R2 ... 76.00
Midland,Pa. C18 ... 76.00
Munhall,Pa. U5 ... 76.00
So.Chicago R2,U5,W14 76.00
So.Duquesne,Pa. U5 ... 76.00
Struthers,O. Y1 ... 76.00
Warren,O. C17 ... 76.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ... $87.50
Canton,O. R2 ... 87.50
Cleveland R2 ... 87.50
Fontana,Calif. K1 ... 108.50
Gary,Ind. U5 ... 87.50
Massillon,O. R3 ... 87.50
So.Chicago,Ill. R2 ... 87.50
So.Duquesne,Pa. U5 ... 87.50

SHEET BARS (NT)
Fontana,Calif. K1 ... $93.18

SKELP
Aliquippa,Pa. J5 ... 3.65
Munhall,Pa. U5 ... 3.55
Warren,O. R2 ... 3.55
Youngstown R2, U5 ... 3.55

WIRE RODS
Alton,Ill. LI ... 4.70
AlabamaCity, Ala. R2 ... 4.325
Buffalo W12 ... 4.325
Cleveland A7 ... 4.325
Donora,Pa. A7 ... 4.325
Fairfield,Ala. T2 ... 4.325
Fontana,Calif. K1 ... 5.125
Houston S5 ... 4.725
Johnstown,Pa. B2 ... 4.325
Joliet,Ill. A7 ... 4.325
KansasCity,Mo. S5 ... 4.665
LosAngeles B3 ... 5.125
Minnequa,Colo. C10 ... 4.575
Monessen,Pa. P7 ... 4.525
No.Tonawanda,N.Y.B11 4.325
Pittsburg,Calif. C11 ... 4.975
Portsmouth,O. P12 ... 4.525
Roebling, N. J. R5 ... 4.425
So. Chicago,Ill R2 ... 4.325
SparrowsPoint,Md. B2 ... 4.425
Sterling,Ill.(1) N15 ... 4.325
Struthers,O. Y1 ... 4.325
Torrance,Calif. C11 ... 5.125
Worcester,Mass. A7 ... 4.625

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ... 4.675
Lackawanna,N.Y. B2 ... 4.675
Munhall,Pa. U5 ... 4.675
So.Chicago,Ill. U5 ... 4.675

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity, Ala. R2 ... 3.85
Aliquippa,Pa. J5 ... 3.85
Bessemer,Ala. T2 ... 3.85
Bethlehem,Pa. B2 ... 3.90
Clairton,Pa. U5 ... 3.85
Fairfield,Ala. T2 ... 3.85
Fontana,Calif. K1 ... 4.50
Gary,Ind. U5 ... 3.85
Geneva,Utah C11 ... 3.85
Houston S5 ... 4.25
Ind.Harbor,Ind. I-2 ... 3.85
Johnstown,Pa. B2 ... 3.90
KansasCity,Mo. S5 ... 4.45
Lackawanna,N.Y. B2 ... 3.90
LosAngeles B3 ... 4.45
Minnequa,Colo. C10 ... 4.30
Munhall,Pa. U5 ... 3.85
Niles,Calif.(22) P1 ... 4.56
Phoenixville,Pa. P4 ... 4.95
Seattle B3 ... 4.50
So.Chicago,Ill. U5, W14 3.85
So.SanFrancisco B3 ... 4.40
Torrance,Calif. C11 ... 4.45
Weirton,W.Va. W6 ... 4.10

Wide Flange
Bethlehem,Pa. B2 ... 3.90
Clairton,Pa. U5 ... 3.85
Fontana,Calif. K1 ... 5.65
Johnstown,Pa. B2 ... 3.90
Lackawanna,N.Y. B2 ... 3.90
Munhall,Pa. U5 ... 3.85
So. Chicago,Ill U5 ... 3.85

Alloy Stand. Shapes
Clairton,Pa. U5 ... 4.725
Fontana,Calif. K1 ... 5.925
Gary,Ind. U5 ... 4.725
Munhall,Pa. U5 ... 4.725
So.Chicago,Ill. U5 ... 4.725

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ... 5.80
Bessemer,Ala T2 ... 5.80
Bethlehem,Pa. B2 ... 5.80
Clairton,Pa. U5 ... 5.80
Fairfield,Ala T2 ... 5.80
Fontana,Calif. K1 ... 6.45
Gary,Ind. U5 ... 5.80
Geneva,Utah C11 ... 5.80
Ind.Harbor,Ind. I-2 ... 5.80
Ind.Harbor,Ind Y1 ... 6.30
Johnstown,Pa. B2 ... 5.80
Lackawanna,N.Y. B2 ... 5.80
LosAngeles B3 ... 6.35
Munhall,Pa. U5 ... 5.80
Seattle B3 ... 6.40
So.Chicago,Ill. U5 ... 5.80
So.SanFrancisco B3 ... 6.30
Struthers,O. Y1 ... 6.30

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ... 5.80
Lackawanna,N.Y. B2 ... 5.80
Munhall,Pa. U5 ... 5.75
So.Chicago,Ill. U5 ... 5.75

BEARING PILES
Munhall,Pa. U5 ... 3.85
So.Chicago,Ill. U5 ... 4.10

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.95
Bessemer,Ala. T2 ... 5.95
Clairton,Pa. U5 ... 5.95
Cleveland J5, R2 ... 5.95
Conshohocken,Pa. A3 ... 6.20
Ecorse,Mich. G5 ... 6.90
Fairfield,Ala. T2 ... 5.95
Fontana,Calif.(30) K1 ... 6.65
Gary,Ind. U5 ... 5.95
Geneva,Utah C11 ... 5.95
Ind.Harbor,Ind. I-2 ... 5.95
Ind.Harbor,Ind. Y1 ... 6.45
Johnstown,Pa. B2 ... 5.95
Munhall,Pa. U5 ... 5.95
Pittsburgh J5 ... 5.95
Seattle B3 ... 6.85
Sharon,Pa. S3 ... 5.95
So.Chicago,Ill. U5 ... 5.95
SparrowsPoint,Md. B2.. 5.95
Warren,O. R2 ... 5.95
Youngstown Y1 ... 6.45
Youngstown U5 ... 5.95

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ... 5.35
Coatesville,Pa. L7 ... 5.75
Conshohocken,Pa. A3 ... 5.55
Fontana,Calif. K1 ... 6.20
Gary,Ind. U5 ... 5.25
Johnstown,Pa. B2 ... 5.25
Munhall,Pa. U5 ... 5.25
Sharon,Pa. S3 ... 5.70
So.Chicago,Ill. U5 ... 5.25
SparrowsPoint,Md. B2.. 5.25

FLOOR PLATES
Cleveland J5 ... 4.95
Conshohocken,Pa. A3 ... 4.95
Ind.Harbor,Ind. I-2 ... 4.95
Munhall,Pa. U5 ... 4.95
So.Chicago, Ill. U5 ... 4.95

PLATES, Ingot Iron
Ashland,c.l. (15) A10 ... 4.15
Cleveland,c.l. R2 ... 4.50
Warren,O., c.l. R2 ... 4.50

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ... 3.90
Aliquippa,Pa. J5 ... 3.90
Ashland,Ky. (15) A10 ... 3.90
Bessemer,Ala. T2 ... 3.90
Clairton,Pa. U5 ... 3.90
Claymont,Del. C22 ... 4.35
Cleveland J5, R2 ... 3.90
Coatesville,Pa. L7 ... 4.35
Conshohocken,Pa. A3 ... 4.35
Ecorse,Mich. G5 ... 4.45
Fairfield,Ala. T2 ... 3.90
Fontana,Calif.(30) K1 .. 4.55
Gary,Ind. U5 ... 3.90
GraniteCity,Ill. G4 ... 4.60
Geneva,Utah C11 ... 3.90
Harrisburg,Pa. C5 ... 6.50
Houston S5 ... 4.30
Ind.Harbor,Ind. I-2, Y1.3.90
Johnstown,Pa. B2 ... 3.90
Lackawanna,N.Y. B2 ... 3.90
Minnequa,Colo. C10 ... 4.70
Munhall,Pa. U5 ... 3.90
Pittsburgh J5 ... 3.90
Seattle B3 ... 4.80
Sharon,Pa. S3 ... 4.15
So.Chicago,Ill. U5, W14..3.90
SparrowsPoint,Md. B2 .. 3.90
Stubenville,O. W10 ... 3.90
Warren,O. R2 ... 3.90
Weirton,W.Va. W6 ... 4.20
Youngstown R2, U5, Y1.3.90

PLATES, Carbon A.R.
Fontana,Calif. K1 ... 5.70
Geneva,Utah C11 ... 5.05

PLATES, Wrought Iron
(Add 4.7% to base and extras)
Economy,Pa. B14 ... 8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 .. 3.95
Aliquippa,Pa. J5 ... 3.95
Alton,Ill. LI ... 4.50
Atlanta,Ga. A11 ... 4.50
Bessemer,Ala. T2 ... 3.95
Buffalo R2 ... 3.95
Canton,O. R2 ... 3.95
Clairton,Pa. U5 ... 3.95
Cleveland R2 ... 3.95
Detroit R7 ... 4.10
Ecorse,Mich. G5 ... 4.30
Emeryville,Calif. J7 ... 4.70
Fairfield,Ala. T2 ... 3.95
Fontana,Calif. K1 ... 4.65
Gary,Ind. U5 ... 3.95
Houston S5 ... 4.35
Ind.Harbor,Ind. I-2, Y1.3.95
Johnstown,Pa. B2 ... 3.95
KansasCity, Mo. S5 ... 4.55
Lackawanna,N.Y. B2 ... 3.95
LosAngeles B3 ... 4.65
Milton,Pa. B6 ... 4.55
Minnequa,Colo. C10 ... 4.40
Niles,Calif. P1 ... 4.65
N.Tonawanda,N.Y. B11.3.95
Pittsburg,Calif. C11 ... 4.65
Pittsburgh J5 ... 3.95
Seattle B3, N14 ... 4.70
So.Chicago R2,U5,W14 .. 3.95
So.Duquesne,Pa. U5 ... 3.95
So.SanFran.,Calif. B3... 4.70
Sterling,Ill. N15 ... 4.55
Struthers,O. Y1 ... 3.95
Torrance,Calif. C11 ... 4.65
Weirton,W.Va. W6 ... 4.10
Youngstown R2, U5 ... 3.95

BAR SIZE ANGLES, S. Shapes
Aliquippa,Pa. J5 ... 3.95
Atlanta A11 ... 4.50
Niles,Calif. P1 ... 4.65
SanFrancisco S7 ... 5.00

BAR SIZE ANGLES, H.R.CARBON
Bethlehem,Pa. B2 ... 4.15

BARS,Hot-Rolled Alloy
Bethlehem,Pa. B2 ... 4.675
Buffalo R2 ... 4.675
Canton,O. T7 ... 4.72
Canton,O. R2 ... 4.675
Clairton,Pa. U5 ... 4.675
Detroit R7 ... 4.825
Ecorse,Mich. G5 ... 5.025
Fontana,Calif. K1 ... 5.725
Gary,Ind. U5 ... 4.675
Houston S5 ... 5.075
Ind.Harbor,Ind. I-2, Y1.4.675
Johnstown,Pa. B2 ... 4.675
KansasCity,Mo. S5 ... 5.275
Lackawanna,N.Y. B2 .. 4.675
LosAngeles B3 ... 5.725
Massillon,O. R2 ... 4.675
Midland,Pa. C18 ... 4.675
So.Chicago R2,U5,W14.4.675
So.Duquesne,Pa. U5 .. 4.675
Struthers,O. Y1 ... 4.675
Warren,O. C17 ... 4.675
Youngstown U5 ... 4.675

BAR SHAPES, Hot-Rolled Alloy
Clairton Pa. U5 ... 4.925
Gary,Ind. U5 ... 4.925
Youngstown U5 ... 4.925

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.925
Bessemer,Ala. T2 ... 5.925
Bethlehem,Pa. B2 ... 5.925
Clairton Pa. U5 ... 5.925
Cleveland R2 ... 5.925
Ecorse,Mich. G5 ... 6.675
Fairfield,Ala. T2 ... 5.925
Fontana,Calif. K1 ... 6.975
Gary,Ind. U5 ... 5.925
Ind.Harbor,Ind. I-2 ... 5.925
IndianaHarbor,Ind. Y1.6.425
Johnstown,Pa. B2 ... 5.925
Lackawanna,N.Y. B2 .. 5.925
LosAngeles B3 ... 6.625
Pittsburgh J5 ... 5.925
Seattle B3 ... 6.675
So.Duquesne,Pa. U5 ... 5.925
So.San Francisco B3 ... 6.675
Struthers,O. Y1 ... 6.425
Youngstown U5 ... 5.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ... 4.925
BeaverFalls,Pa. R2 ... 4.925
BeaverFalls,Pa. M12.. 4.925
Buffalo B5 ... 4.975
Camden,N.J. P13 ... 5.375
Carnegie,Pa. C12 ... 4.925
Chicago B5 ... 4.925
Chicago W18 ... 4.925
Cleveland A7, C20 ... 4.925
Detroit P17, R7 ... 5.075
Detroit B5 ... 5.125
Donora,Pa. A7 ... 4.925
Elyria,O. W8 ... 4.925
FranklinPark,Ill. N5 ... 4.925
Gary,Ind. R2 ... 4.925
GreenBay,Wis. F7 ... 4.925
Hammond,Ind. I-2,M13 4.925
Hartford,Conn. R2 ... 5.475
LosAngeles R2 ... 6.375
Mansfield,Mass B5 ... 5.475
Massillon,O. R2, R8 .. 4.925
Monaca,Pa. S17 ... 4.925
Newark,N.J. W18 ... 5.375
Plymouth,Mich. P5 ... 5.175
Pittsburgh J5 ... 4.925
Putnam Conn. W18 ... 5.475
Readville,Mass. C14 ... 5.475
St.Louis,Mo. M5 ... 5.30
So.Chicago,Ill. W14 ... 4.925
SpringCity,Pa. K3 ... 5.375
Struthers,O. Y1 ... 4.925
Waukegan,Ill A7 ... 4.925
Youngstown Y1 ... 4.925
Youngstown F3 ... 4.925

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ... 6.00
BeaverFalls,Pa. M12 .. 6.00
Bethlehem, Pa. B2 ... 6.00
Buffalo B5 ... 6.00
Camden,N.J. P13 ... 6.40
Canton,O. R2 ... 6.00
Canton,O. T7 ... 5.90
Carnegie,Pa. C12 ... 6.00
Chicago B5 ... 6.00
Chicago W18 ... 6.00
Cleveland A7 ... 6.05
Cleveland C20 ... 6.00
Detroit P17, R7 ... 6.15
Detroit B5 ... 6.20
Donora,Pa. A7 ... 6.05
Elyria,O. W8 ... 6.00
Gary,Ind. R2 ... 6.00
Hammond,Ind. I-2,M13 6.00
Hartford,Conn. R2 ... 6.45
Lackawanna,N.Y. B2 .. 6.00
Mansfield,Mass. B5 ... 6.45
Massillon,O. R2,R8 ... 6.00
Midland,Pa. C18 ... 6.00
Monaca,Pa. S17 ... 6.00
Newark,N.J. W18 ... 6.35
Plymouth,Mich. P5 ... 6.20
So.Chicago,Ill. R2, W14 6.00
SpringCity,Pa. K3 ... 6.20
Struthers,O. Y1 ... 6.00
Warren,O. C17 ... 6.00
Waukegan,Ill. A7 ... 6.05
Worcester,Mass. A7 ... 6.35
Youngstown Y1 ... 6.00
Youngstown F3 ... 6.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala R2 ... 3.95
Atlanta A11 ... 4.50
Buffalo R2 ... 3.95
Cleveland R2 ... 3.95
Emeryville,Calif. J7 ... 4.70
Fairfield,Ala. T2 ... 3.95
Fontana,Calif. K1 ... 4.65
Gary,Ind U5 ... 3.95
Houston S5 ... 4.35
Ind.Harbor,Ind. I-2, Y1.3.95
Johnstown,Pa. B2 ... 3.95
KansasCity,Mo. S5 ... 4.55
Lackawanna,N.Y. B2 .. 3.95
LosAngeles B3 ... 4.65
Milton,Pa. B6 ... 4.55
Minnequa,Colo. C10 ... 4.75
Niles,Calif. P1 ... 4.65
Pittsburg,Calif. C11 ... 4.65
Pittsburgh J5 ... 3.95
SandSprings,Okla. S5 ... 4.85
Seattle B3, N14 ... 4.70
So.Chicago,Ill. R2 ... 3.95
So.Duquesne,Pa. U5 ... 3.95
So.SanFrancisco B2 ... 4.70
SparrowsPoint,Md. B2... 3.95
Sterling,Ill. (1) N15 ... 4.70
Struthers,O. Y1 ... 3.95
Torrance,Calif. C11 ... 4.65
Youngstown R2, U5 ... 3.95

BARS, Reinforcing (Fabricated; to consumers)
Huntington,W.Va. W7 ... 5.50
Johnstown, ¼-1" B2 ... 5.25
KansasCity S5 ... 6.05
LosAngeles B3 ... 5.45
Marion,O. P11 ... 5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.
B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Div., H. K. Porter Co.
B14 A. M. Byers Co.
C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept., Wickwire Spencer Steel Division
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. &Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co
L7 Lukens Steel Co.

Seattle B3 N14 ..... 5.80
Sand Springs S5 ..... 6.45
So.SanFrancisco B3 .... 5.45
SparrowsPt. ¼-1" B2 .. 5.25
Williamsport,Pa. S19 ... 5.35

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ... 4.75
ChicagoHts.(3,4) I-2 .. 4.75
Franklin,Pa.(3,4) F5 ... 4.75
FortWorth,Tex.(26) T4 .. 4.85
Huntngt.W.Va.(3) W7 .. 5.75
Marion,O.(3) P11 ..... 4.75
Moline,Ill.(3) R2 ..... 4.60
Tonawanda(3,4) B12 .. 5.00
Williamsport(3) S19 ... 5.25
Williamsport,Pa. S19 ... 5.35

BARS, Wrought Iron
(Add 4.7% to base and extras)
Economy,Pa.(S.R.) B14 9.60
Economy,Pa.(D.R.)B14 11.90
Economy(Staybolt) B14 12.20
McK.Rks.(Staybolt) L5 14.50
McK.Rks.(S.R.) L5 .... 9.60
McK.Rks.(D.R.) L5 .. 13.00

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 .. 3.775
Ashland,Ky.(8)A10 ... 3.775
Butler,Pa. A10 ..... 3.775
Cleveland J5, R2 ..... 3.775
Conshohocken,Pa. A3 .. 4.175
Detroit M1 ..... 4.40
Ecorse,Mich. G5 ..... 3.975
Fairfield,Ala. T2 ..... 3.775
Fontana,Calif. K1 .... 4.825
Gary,Ind. U5 ..... 3.775
Geneva,Utah C11 ..... 3.875
GraniteCity,Ill. G4 ..... 4.30
Ind.Harbor,Ind. I-2, Y1 3.775
Irvin,Pa. U5 ..... 3.775
Lackawanna,N.Y. B2 .. 3.775
Munhall, Pa. U5 ..... 3.775
Niles,O. N12 ..... 5.425
Pittsburg,Calif. C11 .. 4.475
Pittsburgh J5 ..... 3.775
Sharon,Pa. S3 ..... 4.175
So.Chicago,Ill. W14 ... 3.775
SparrowsPoint,Md. B2 3.775
Steubenville,O. W10 .. 3.775
Torrance,Calif. C11 ... 4.475
Warren,O. R2 ..... 3.775
Weirton,W.Va. W6 .... 3.775
WestLeechburg,Pa. A4 .. 3.925
Youngstown U5, Y1 .... 3.775

SHEETS, H.R. (19 gage)
AlabamaCity,Ala. R2 .. 4.925
Dover,O. R1 ..... 5.825
Mansfield,O. E6 ..... 5.65
Niles,O. N12 ..... 5.675
Torrance,Calif. C11 .... 5.575

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .... 6.925
Ecorse,Mich. G5 ..... 7.475
Fontana,Calif. K1 .... 7.875
Gary,Ind. U5 ..... 6.925
IndianaHarbor,Ind. Y1 .. 7.425
IndianaHarbor,Ind. I-2 .. 6.925
Irvin,Pa. U5 ..... 6.925
Lackawanna(37) B2 .... 6.925
Pittsburgh J5 ..... 6.925
SparrowsPoint(38) B2.. 6.925
Warren,O. R2 ..... 6.925
Weirton,W.Va. W6 .... 7.275
Youngstown Y1 ..... 7.425

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy
Cleveland J5, R2 .... 5.675
Conshohocken,Pa. A3 .. 5.925
Ecorse,Mich. G5 ..... 6.225
Fairfield,Ala. T2 ..... 5.675
Fontana,Calif. K1 .... 6.775
Gary,Ind. U5 ..... 5.675
Ind.Harbor,Ind. I-2 .... 5.675
Ind.Harbor,Ind. Y1 .... 6.175
Irvin,Pa. U5 ..... 5.675
Lackawanna(35) B2 .... 5.675
Munhall U5 ..... 5.675
Pittsburgh J5 ..... 5.675
Sharon,Pa. S3 ..... 5.675
So.Chicago,Ill. U5 ..... 5.675
SparrowsPoint(36) B2.. 5.675
Warren,O. R2 ..... 5.675
Weirton,W.Va. W6 .... 6.025
Youngstown U5 ..... 5.675
Youngstown Y1 ..... 6.175

SHEETS, Cold-Rolled Steel (Commercial Quality)
Butler,Pa. A10 ..... 4.375
Cleveland J5, R2 ..... 4.375
Ecorse,Mich. G5 ..... 4.775
Fairfield,Ala. T2 ..... 4.375
Follansbee,W.Va. F4 .. 5.375
Fontana,Calif. K1 .... 5.675
Gary,Ind. U5 ..... 4.375
GraniteCity,Ill. G4 .... 5.275
Ind.Harbor,Ind. I-2,Y1 4.375
Irvin,Pa. U5 ..... 4.375
Lackawanna,N.Y. B2 .. 4.375
Middletown,O. A10 .... 4.375
Pittsburgh,Calif. C11 .. 5.525
Pittsburgh J5 ..... 4.375
SparrowsPoint,Md. B2.. 4.375
Steubenville,O. W10 .... 4.375
Warren,O. R2 ..... 4.375
Weirton,W.Va. W6 .... 4.375
West Leechburg,Pa. A4 .. 5.45
Youngstown Y1 ..... 4.375

SHEETS, Galv'd No. 10 Steel
AlabamaCity,Ala. R2 .. 5.075
Ashland,Ky.(8) A10 .. 5.075
Canton,O. R2 ..... 5.075
Delphos,O. N16 ..... 5.675
Dover,O. R1 ..... 5.775
Fairfield,Ala. T2 ..... 5.075
Gary,Ind. U5 ..... 5.075
GraniteCity,Ill. G4 ..... 5.50
Ind.Harbor,Ind. I-2 .... 5.075
Irvin,Pa. U5 ..... 5.075
Kokomo,Ind.(13) C16 .. 5.475
MartinsFerry,O. W10 .... 5.075
Niles,O. N12 ..... 6.275
Pittsburg,Calif. C11 .... 6.25
SparrowsPoint,Md. B2 .. 5.075
Steubenville,O. W10 .... 5.075
Torrance,Calif. C11 .... 5.825
Weirton,W.Va. W6 .... 5.075

SHEETS, Galvanized No. 10, High-Strength Low-Alloy
Irvin,Pa. U5 ..... 7.625
SparrowsPoint(39) B2.. 7.775

SHEETS, Galvannealed Steel
Canton,O. R2 ..... 5.625
Irvin,Pa. U5 ..... 5.625
Kokomo,Ind.(13) C16 .. 6.025
Niles,O. N12 ..... 6.825

SHEETS ZINCGRIP STEEL No. 10
Butler,Pa. A10 ..... 5.225
Middletown,O. A10 .. 5.325

SHEETS, Electro Galvanized
Cleveland R2 (28) 5.925
Niles,O. R2 (28) 5.925
Weirton,W.Va. W6 (28) 5.775

SHEETS, Well Casing
Fontana,Calif. K1 .... 5.34

SHEETS, Stock, 29 ga.
Yorkville,O. W10 ..... 7.60
Follansbee,W.Va. F4 ... 7.10
Follansbee (23) F4 .... 8.425

SHEETS, Enameling Iron
Ashland,Ky.(8) A10 .. 4.925
Cleveland R2 ..... 4.925
Gary,Ind. U5 ..... 4.925
GraniteCity,Ill. G4 .... 5.625
Ind.Harbor,Ind. I-2 .... 4.925
Irvin,Pa. U5 ..... 4.925
Middletown,O. A10 .... 4.925
Youngstown Y1 ..... 4.925

SHEETS, Long Terne Steel (Commercial Quality)
BeechBottom,W.Va.W10 5.475
Gary,Ind. U5 ..... 5.475
Mansfield,O. E6 ..... 6.05
Middletown,O. A10 .... 5.475
Niles,O. N12 ..... 6.275
Weirton,W.Va. W6 .... 5.475

ROOFING SHORT TERNES (8 lb Coated)
Gary,Ind. U5 ..... 9.75

TIN PLATE, American 1.25 Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.20	$8.50
Fairfield,Ala. T2	8.50	8.65
Gary,Ind. U5	8.20	8.50
Ind.Har. I-2, Y1	8.20	8.50
Irvin,Pa. U5	8.20	8.50
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.50	9.05
Warren,O. R2	8.20	
Weirton,W.Va.W6	8.20	8.50
Yorkville,O. W10	8.20	8.50

STRIP, Hot-Rolled High-Strength Low-Alloy
Bessemer,Ala. T2 ..... 5.65
Conshohocken,Pa. A3 .. 5.90
Ecorse,Mich. G5 ..... 6.30
Fairfield,Ala. T2 ..... 5.65
Fontana,Calif. K1 .... 6.35
Gary,Ind. U5 ..... 5.65
Ind.Harb.,Ind. I-2 .... 5.65
Ind.Harbor,Ind. Y1 .... 6.15
Lackawanna,N.Y. B2 .. 5.70
LosAngeles(25) B3 .... 6.40
Seattle(25) B3 ..... 6.65
Sharon,Pa. S3 ..... 5.65
So.SanFrancisco(25) B3 6.40
SparrowsPoint,Md. B2 .. 5.70
Warren,O. R2 ..... 5.65
Weirton,W.Va. W6 .... 6.10
Youngstown Y1 ..... 6.15
Youngstown U5 ..... 5.65

STRIP, Cold-Rolled High-Strength Low-Alloy
Cleveland J5 ..... 7.45
Cleveland A7 ..... 7.30
Dover,O. G6 ..... 8.00
Ecorse,Mich. G5 ..... 8.15
Lackawanna,N.Y. B2 .. 7.90
Sharon,Pa. S3 ..... 7.30
SparrowsPoint,Md. B2 .. 7.50
Warren,O. R2 ..... 7.30
Weirton,W.Va. W6 .... 7.95
Youngstown Y1 ..... 7.80

STRIP, Hot-Rolled Carbon
Ala.City,Ala.(27) R2 .. 3.725
Alton,Ill. L1 ..... 4.20
Ashland,Ky.(8) A10 .. 3.725
Atlanta A11 ..... 4.275
Bessemer,Ala. T2 .... 3.725
Bridgeport,Con.(10)S15 4.225
Buffalo(27) R2 ..... 3.725
Butler,Pa. A10 ..... 3.725
Carnegie,Pa. S18 ..... 4.225
Conshohocken,Pa. A3 .. 4.125
Detroit M1 ..... 4.40
Ecorse,Mich. G5 ..... 4.025
Fairfield,Ala. T2 .... 3.725
Fontana,Calif. K1 .... 5.175
Gary,Ind. U5 ..... 3.725
Houston,Tex. S5 ..... 4.125
Ind.Harbor,Ind. I-2,Y1 3.725
Johnstown,Pa.(25) B2.. 3.725
KansasCity,Mo.(9) S5.. 4.325

(Turn to page 172)

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40		
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

SHEETS, SILICON, H.R. or C.R. COILS (Cut lengths ½c lower)

	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom,W.Va.(cut lengths)	...	...	7.85	9.10	9.90
BrackenridgePa. A4	...	...	8.35	9.60	10.40
GraniteCity,Ill. G4 (cut lengths)	...	...	8.55	9.80	...
IndianaHarbor,Ind. I-2	7.55	7.85	(34)	(41)	...
Mansfield,O. E6 (cut lengths)	7.20	7.35	7.85	9.10	9.90
Niles,O. N12 (cut lengths)	7.95	7.35	7.85	...	...
Vandergrift,Pa. U5	...	7.85	8.35	9.60	10.40
Warren,O. R2	7.55	7.85	8.35	9.60	10.40
Zanesville,O. A10	...	7.85	8.35	9.60	10.40

SHEETS, SILICON (22 Ga. Base) COILS (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom,W.Va.(cut lengths)	10.45	11.00	11.70	12.50
Brackenridge,Pa. A4	10.95	...	...	...
Vandergrift,Pa. U5	10.95	11.50	12.20	13.00
Warren,O. R2	10.95	...	...	...
Zanesville,O. A10	10.95	11.50	12.20	13.00

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	15.35	15.85
Vandergrift,Pa. U5	13.50	14.35	15.35	15.85

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Beren,O. C7		6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.80	7.65	8.25	10.20	12.50
Bristol,Conn. W1			8.55	10.50	
Carnegie,Pa. S18		7.65	8.25	10.20	12.50
Cleveland A7	5.10	7.30	8.25	10.20	12.50
Dearborn,Mich. I63	6.05	7.90	8.50		
Detroit D2	6.45	7.50	8.10		
Dover,O. G6	5.70	7.65	8.25	10.20	12.50
FranklinPark,Ill. T6	5.45	7.45	8.40	10.35	12.65
Harrison,N.J. C18			8.55	10.50	12.80
Mattapan,Mass. T6	5.95	7.60	8.55	10.50	12.80
NewBritn.,Conn.(10) S15	5.80	7.65	8.25	10.20	12.50
NewCastle,Pa. B4	5.80	7.65	8.25	10.20	
NewCastle,Pa. E5	5.80	7.65	8.25	10.20	12.50
NewHaven,Conn. D2	6.70	7.60	8.20		
NewYork W3		7.95	8.55	10.50	12.80
Pawtucket,R.I. S85:					
Cleve.-rPitts.Base		7.65	8.25	10.20	12.50
Worcester,Mass.,Base	6.30	7.95	8.55	10.50	12.80
Sharon,Pa. S3	5.80	7.65	8.25	10.20	12.50
Trenton,N.J. R5		7.95	8.55	10.50	12.80
Wallingford,Conn. W2	6.30	7.60	8.20	10.15	12.65
Warren,O. T6	6.20	7.65	8.25	10.20	12.50
Weirton,W.Va. W6	5.80	7.65	8.25	10.20	12.50
Worcester,Mass. A7	5.40	7.60	8.55	10.50	12.80
Worcester,Mass. T6	5.95	7.60	8.25	10.50	12.80
Youngstown C8		7.65	8.25	10.20	12.50

Spring Steel (Tempered)

Trenton,N.J. R5 (29)	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30*	12.50*	15.35*
Youngstown C8	...	...	10.30	12.50	15.35

*Plus 1.575 per 100 lb

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.-HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Div.
N14 Northwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P8 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.& I. Div.
S14 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S24 Seidelhuber Steel

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.

U4 Universal Cyclops Steel
U5 United States Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

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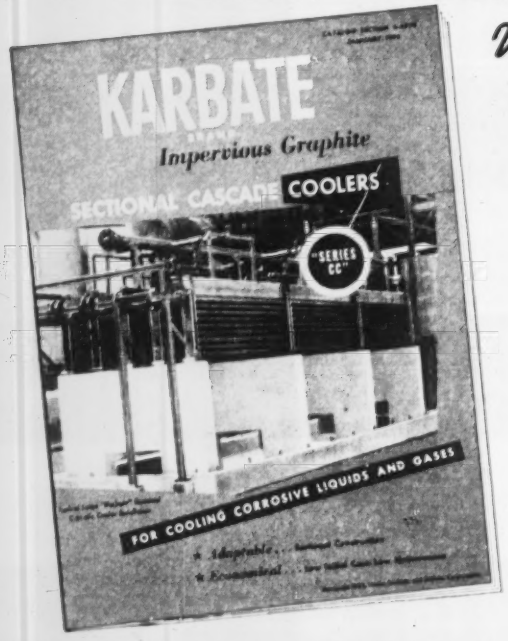

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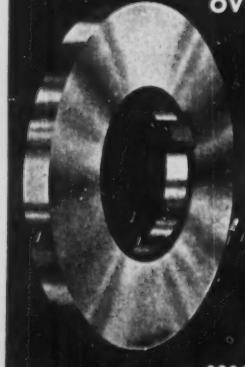

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To reach the metalworking market. Just list the materials or machines you have for sale in the "Equipment—Materials" section and STEEL will do the rest. It is read weekly by specifiers and buyers in the plants which do more than 92% of the metalworking industry's business. For rates and further details, write STEEL, Penton Building, Cleveland 13, Ohio.

ORES–COKE–REFRACTORIES

Prices as reported to STEEL, *changes shown in italic*

ORES

Lake Superior Iron Ore

(Prices effective for ore delivered up to and including June 30, 1953; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.10
Old range nonbessemer	9.95
Mesabi bessemer	9.85
Mesabi nonbessemer	9.70
Open-hearth lump	10.95
High phosphorus	9.70

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect on Dec. 31, 1952, and increases or decreases after such date for buyer's account.

Eastern Local Iron Ore

Cents per unit del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	22.00
North African hematites (spot)	26.00-28.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-1.21 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 90c-93c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$27.00-$28.00
45% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	nom. $32

Domestic

(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89.00; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lochhaven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $99.30 Salina, Pa., $104.55; Niles, O., $109; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $99.30; Hays, Pa., $105.10; Niles, O., $107; E. Chicago, Ind., Joliet, Rockdale, Ill., $109.70; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $179.55; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $186.90.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $69.30; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $92.40; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $127; Johnstown, Pa., $127.30; Clearfield, Pa., $135; St. Louis, $138; Athens, Tex., $140.90.

Nozzles

Reesdale, Pa., $203.20; Johnstown, Pa., $208.40; Clearfield, Pa., $219.45; St. Louis, $224.65; Athens, Tex., $225.20.

Runners

Reesdale, Pa., $158.20; Johnstown, Pa., $161.70; Clearfield, Pa., $168.60; St. Louis, $170.30; Athens, Tex., $174.40.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St., Louis, Mexico, Mo., $166.30; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $210.20; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $244.85; Danville, Ill., $247.85; Clearfield, Pa., $252.

METALLURGICAL COKE

Price net ton

BEEHIVE OVENS

Connellsville fur.	$14.50-15.00
Connellsville fdry.	16.50-17.50
New River foundry	20.80
Wise county foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens New England, del.	*26.05
Chicago ovens	24.50
Chicago, del.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, del.	28.12
Cincinnati, del.	25.85
Painesville, O., ovens	25.50
Cleveland, del.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	21.65
Cincinnati, del.	26.58
LoneStar, Tex., ovens	18.50
Philadelphia, ovens	23.95
Swedeland, Pa., ovens	23.85
St. Louis, ovens	
St. Louis, del.	26.00
Portsmouth, O., ovens	24.00
Cincinnati, del.	26.62
Detroit, ovens	25.50
Detroit, del.	26.50
Buffalo, del.	28.08
Flint, del.	28.23
Pontiac, del.	27.06
Saginaw, del.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	30.00-33.00
Industrial xylol	30.00-33.50

Per ton, bulk, ovens

Sulphate of ammonia	$44.45
Birmingham area	$49.50

Cents per pound, ovens

Phenol, 40 (carlots, nonreturnable drums)	17.25

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Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 70%, $43; 60%, $40.

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(Continued from page 169)

Lackawanna,N.Y. (32) B2 3.725
LosAngeles (25) B3 ....4.475
Milton,Pa. B6 .....4.35
Minnequa,Colo. C10 ...4.775
NewBritain (10) S15 ...4.225
N.Tonawanda,N.Y. B11 3.725
Pittsburg,Calif. C11 ...4.475
Riverdale,Ill. A1 .....3.725
SanFrancisco S7 .....5.00
Seattle (25) B3 .....4.725
Seattle N14 .....4.75
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. W14 ...3.725
So.SanFrancisco (25) B3 4.475
SparrowsPoint,Md. B2..3.725
Sterling,Ill. N15 .....4.725
Torrance,Calif. C11 ...4.475
Warren,O. R2 .....3.725
Weirton,W.Va. W6 ....3.825
WestLeechburg,Pa. A4..3.975
Youngstown U5, Y1 ...3.725

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn. (10) S15 6.05
Carnegie,Pa. S18 .....6.45
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....6.10
Houston,Tex. S5 .....6.50
KansasCity,Mo. S5 ....6.70
Midland,Pa. C18 .....5.85
NewBritn.,Conn. (10) S15 6.05
Sharon,Pa. S3 .....6.45
Youngstown U5 .....6.10

STRIP, Cold-Rolled Carbon

Anderson,Ind. (40) G6 ...5.50
Bridgeprt,Conn. (10) S15 5.80
Butler,Pa. A10 .....5.60
Cleveland A7, J5 .....5.10
Dearborn,Mich. D3 .....6.05
Detroit D2 .....5.60
Detroit M1 .....5.45
Dover,O. (40) G6 .....5.50
Ecorse,Mich. G5 .....5.30
Follansbee,W.Va. F4 ...5.10
Fontana,Calif. K1 .....6.75
FranklinPark,Ill. (40) T6 .5.35
Ind.Harbor,Ind. I-2 ....5.35
Lackawanna,N.Y. B2 ...5.10
LosAngeles C1 .....7.1
Mattapan,Mass. T6 .....5.95
Middletown,O. A10 .....5.10
NewBritain (10) S15 ....5.80
NewCastle,Pa. B4 .....5.80
NewCastle,Pa. (40) E5 ...5.70
NewHaven,Conn. D2 ....5.85
NewHaven,Conn. A7 ...5.60
Pawtucket,R.I. R3 .....6.45
Pawtucket,R.I. (21) N8..6.30
Riverdale,Ill. (40) A1 ...5.35
Rome,N.Y. R6 .....5.10
Sharon,Pa. S3 .....5.80
SparrowsPoint,Md. B2 ..5.10
Trenton,N.J. R5 .....6.45
Wallingford,Conn. W2 ..6.30
Warren,O. (40) T5 .....5.70
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown C8 (40) ...5.70
Youngstown Y1 .....5.10

STRIP, Electro Galvanized

Dover,O. G6 .....5.50
Warren,O. T5 .....5.70
Weirton,W.Va. W6 .....5.10
Youngstown C8 .....5.70

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn. (10) S15 12.15
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....11.40
Dover,O. G6 .....11.90
Fontana,Calif. K1 ....13.05
Harrison,N.J. C18 ....12.00
Midland,Pa. C18 .....12.00
NewBritn,Conn. (10) S15 12.15
Pawtucket,R.I. (11) N8..12.15
Pawtucket,R.I. (12) N8..12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ...11.70
Youngstown C8 .....12.00

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8) A10 ..3.975
Warren,O. R2 .....4.325

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....5.70

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.45
Riverdale,Ill. A1 .....4.30
Sharon,Pa. S3 .....4.55
Youngstown U5 .....4.15

WIRE, Merchant Quality

(6 to 8 gage)	An'ld.	Galv.
AlabamaCity R2	6.075	6.325
Aliquippa J5	6.075	6.525‡
Atlanta A11	6.325	6.675
Bartonville (19) K4	6.075	6.40
Buffalo W12	5.225	....
Cleveland A7	6.075	6.225
CrawfordsvilleMS	6.175	6.475
Donora,Pa. A7	6.075	6.225
Duluth,Minn. A7	6.075	6.225
Fairfield T2	6.075	6.225
Houston,Tex. S5	6.475	6.80
Johnstown B2	6.075	6.45†
Joliet,Ill. A7	6.075	6.225
KansasCy,Mo. S5	6.675	7.00
Kokomo,Ind. C16	6.175	6.425
LosAngeles B3	7.025	....
Minnequa C10	6.325	6.70*
Monessen P7	6.075	6.45
Palmer W12	5.525	....
Pitts.Calif. C11	7.025	7.175
Prtsmith.(18) P12	6.475	....
Rankin A7	6.075	6.225
So.Chicago R2	6.075	6.325
So.S.Fran. C10	7.025	7.40*
SparrowsPt. B2	6.175	6.55†
Sterling,Ill. (1) N15	6.075	6.375
Struthers,O. Y1	6.075	6.475
Torrance,Cal. C11	7.025	....
Worcester A7	6.375	6.525

*Based on 14c zinc; 14.50c zinc; ‡17.5c zinc

	Anl'd.	Galv.
WIRE (16 gage)	**Stone**	**Stone**
(Add 4.7% on base and extras)		
Aliquippa J5	10.15	12.15
Bartonville (19) K4	10.25	12.60*
Cleveland A7	10.25	11.55
Crawfrdsville M8	10.75	12.51
Fostoria,O. S1	10.40	12.00
Johnstown B2	10.75	12.58‡
Kokomo C16	10.625	12.325‡
Minnequa C10	10.40	12.425*
Palmer,Mass. W12	10.25	12.15
Pitts.Cal. C11	10.60	11.90
SparrowsPt. B2	10.85	12.68‡
Sterling,Ill. N15	10.75	12.15†
Waukegan A7	10.25	11.55
Worcester A7	11.85	....

*Based on 14c zinc; $14.50c zinc ‡Includes 4.7% increase.

WIRE, Manufacturers Bright

Low Carbon	
AlabamaCity,Ala. R2	5.225
Aliquippa,Pa. J5 (42)	4.85
Atlanta A11	5.475
Alton,Ill. L1	5.45
Bartonville,Ill. K4	5.325
Buffalo W12	5.225
Chicago W13	5.475
Cleveland A7, C20	5.225
Crawfordsville,Ind. M8	5.525
Donora,Pa. A7	5.225
Duluth,Minn. A7	5.225
Fairfield,Ala. T2	5.225
Fostoria,O. (24) S1	5.725
Houston S5	5.625
Johnstown,Pa. B2	5.225
Joliet,Ill. A7	5.225
KansasCity,Mo. S5	5.525
Kokomo,Ind. C16	5.325
LosAngeles B3	6.175
Minnequa,Colo. C10	5.475
Monessen,Pa. P7	5.475
Newark 6-8 ga. I-1	5.88
So.Tonawanda,N.Y. B11	5.225
Palmer,Mass. W12	5.525
Pittsburg,Calif. C11	6.175
Portsmouth,O. P12	5.625
Rankin,Pa. A7	5.225
So.Chicago,Ill. R2	5.225
So.SanFrancisco C10	6.15
SparrowsPoint,Md. B2	5.225
Sterling,Ill. (1) N15	5.225
Struthers,O. Y1	5.225
Torrance,Calif. C11	6.175
Waukegan,Ill. A7	5.225
Worcester,Mass. A7	5.525

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12 (43)	6.35
Cleveland A7 (43)	5.85
Crawf'sville,Ind.M8 (48)	5.70
Dover,O. G6	6.20
Fostoria,O. S1 (43)	6.00
Kokomo,Ind. C16 (43)	5.70
FranklinPark,Ill. T6 (43)	6.20
Massillon,O. R8 (43)	5.85
Monessen,Pa. P16 (43)	6.35
Monessen,Pa. P7 (43)	6.10
Pawkit,R.I. (12) N8 (43)	6.85
Trenton,N.J. R5 (43)	6.15
Worcester,Mass. A7 (43)	6.15
Worcester,Mass. T6 (43)	6.50
Worcester,Mass. W12 (43)	6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.90
Monessen,Pa. P16 (43)	8.50
Muncie,Ind. I-7 (43)	8.70
Roebling,N.J. R5 (43)	8.80
SparrowsPt.,Md. B2 (43)	8.60
Johnstown,Pa. B2 (43)	8.50

ROPE WIRE

Alton,Ill. L1 (43)	8.75
Bartonville,Ill. K4	8.95
Buffalo W12 (43)	8.55
Fostoria,O. S1 (43)	8.85
John-town,Pa. B2 (43)	8.55
Monessen,Pa. P16 (43)	8.55
Monessen,Pa. P7 (43)	8.80
Muncie,Ind. I-7 (43)	8.75
Palmer,Mass. W12 (43)	8.85
Portsmouth,O. P12 (43)	8.55
Roebling,N.J. R5 (43)	8.85
SparrowsPt. B2 (43)	8.65
Struthers,O. Y1 (43)	8.55
Worcester J4, T6 (43)	8.85

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 (43)	6.25
Alton,Ill. L1 (43)	6.55
Bartonville,Ill. K4	6.64
Buffalo W12 (43)	6.25
Cleveland A7 (45)	6.25
Donora,Pa. A7 (43)	6.25
Duluth,Minn. A7 (43)	6.25
Fostoria,O. S1 (43)	6.25
Johnstown,Pa. B2 (43)	6.25
Millbury (12) N6 (43)	6.45
Minnequa,Colo. C10 (43)	6.50
Monessen,Pa. P7 (43)	6.25
Monessen,Pa. P16	6.75
Muncie,Ind. I-7 (43)	6.45
Palmer,Mass. W12 (43)	6.55
Pittsburg,Calif. C11 (43)	7.20
Roebling,N.J. R5 (43)	6.55
Port.mouth,O. P12 (43)	6.25
So.Chicago,Ill. R2 (43)	6.25
So.SanFran. C10 (43)	7.20
SparrowsPt. Md. B2 (43)	6.35
Struthers,O. Y1 (43)	6.25
Trenton,N.J. A7 (43)	6.55
Waukegan,Ill. A7 (43)	6.25
Worcester A7, T6 (43)	6.55
Worcester,Mass. W12 (43)	6.55
Worcester,Mass. J4 (43)	6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.275
Alton,Ill. L1	6.50
Buffalo W12	6.275
Cleveland A7	6.275
Donora,Pa. A7	6.275
Duluth,Minn. A7	6.275
Johnstown,Pa. B2	6.275
LosAngeles B3	7.225
Minnequa,Colo. C10	6.525
Monessen,Pa. P7	6.275
Monessen,Pa. P16 (42)	6.40
NewHaven,Conn. A7	6.575
Palmer,Mass. W12	6.575
Pittsburg,Calif. C11	7.225
Portsmouth,O. P12	6.275
Roebling,N.J. R5	6.575
So.Chicago,Ill. R2	6.275
So.SanFrancisco C10	7.225
SparrowsPoint,Md. B2	6.375
Torrance,Calif. C11	7.225
Trenton,N.J. A7	6.575
Waukegan,Ill. A7	6.275
Worcester,Mass. A7	6.575

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 (43)	9.20
Bartonville,Ill. K4	9.42
Buffalo W12 (43)	8.90
Chicago W13	9.32
Cleveland A7 (43)	8.90
Crawf.sville,Ind. M8 (43)	8.90
Fostoria,O. S1 (43)	8.90
Johnstown,Pa. B2 (43)	8.90
Kokomo,Ind. C16 (43)	8.90
Monessen,Pa. P16 (43)	8.90
Muncie,Ind. I-7 (43)	9.10
Palmer,Mass. W12 (43)	9.20
Roebling,N.J. R5 (43)	9.20
Waukegan,Ill. A7 (43)	8.90
Worcstr,Mass. A7,T6 (43)	9.20

WIRE, Tire Bead

Bartonville,Ill. K4	11.51
Mones en,Pa. P16 (43)	11.40
Roebling,N.J. R5 (43)	11.55

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	135
Ala City,Ala. 17-18ga.R2	222
Aliq.pa.Pa.9-14½ga.J5	1391
Atlanta A11	140
Bartonville,Ill. (19) K4	137
Crawfordsville,Ind. M8	138
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Houston,Tex. S5	145
Johnstown,Pa. B2	138
Johnstown 17ga.,6" B2	229
Joliet,Ill. A7	133
KansasCity,Mo. S5	148
Kokomo,Ind. C16	140
Minnequa,Colo. C10	146*
Monessen,Pa. P7	138
Pittsburg,Calif. C11	156
Rankin,Pa. A7	133
So.Chicago,Ill. R2	135
Sterling,Ill. (1) N15	136

*On 14c zinc; ‡17.5c zinc

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	133
Franklin,Pa. F5	145
Huntington,W.Va. W7	148
Johnstown,Pa. B2	148
Marion,O. P11	140
Minnequa,Colo. C10	138
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	148
Williamsport,Pa. S19	158

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	144
Aliquippa,Pa. J5	148‡
Atlanta A11	149
Bartonville,Ill. (19) K4	146
Crawfordsville,Ind. M8	147
Donora,Pa. A7	142
Duluth,Minn. A7	142
Fairfield,Ala. T2	142
Houston,Tex. S5	154
Johnstown,Pa. B2	145
Joliet,Ill. A7	142
Kansa.City,Mo. S5	158
Kokomo,Ind. C16	149
Minnequa,Colo. C10	153*
Monessen,Pa. P7	147
Pittsburg,Calif. C11	162
Rankin,Pa. A7	142
So.Chicago,Ill. R2	144
So.SanFran.Calif. C10	167*
SparrowsPoint,Md. B2	147
Sterling,Ill. (1) N15	145

*on 14c zinc; ‡17.5c zinc

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	132
Atlanta A11	135
Bartonville,Ill. (19) K4	132
Crawfordsville,Ind. M8	132
Donora,Pa. A7	132
Duluth,Minn. A7	132
Fairfield,Ala. T2	132
Joliet,Ill. A7	132
KansasCity,Mo. S5	144
Kokomo,Ind. C16	134
Minnequa,Colo. C10	137
Pittsburg,Calif. C11	156
So.Chicago,Ill. R2	132
So.SanFran.Calif. C10	156
SparrowsPoint,Md. B2	134
Sterling,Ill. (1) N15	132

TRACK BOLTS (20) Treated

	Col.
KansasCity,Mo. S5 (46)	9.85
Lebanon,Pa. (31) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh P14	9.85
Pittsburgh O3	*10.00*

AXLES

Ind.Harbor,Ind. S13	5.65
Johnstown,Pa. B2	5.65

NAILS, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	127
*Aliquippa,Pa. J5	127
Atlanta A11	130
Bartonville,Ill. (12) K4	127
Chicago,Ill. W13	127
Cleveland A9 (44)	125
Crawfordsville,Ind. M8	127
Donora,Pa. A7	127
Duluth,Minn. A7	127
Fairfield,Ala. T2	127
Galveston,Tex. D7	135
Houston,Tex. S5	135
Johnstown,Pa. B2	127
Joliet,Ill. A7	127
KansasCity,Mo. S5	139
Kokomo,Ind. C16	129
Minnequa,Colo. C10 (44)	123
Monessen,Pa. P7	127
Pittsburg,Calif. C11	146
Portsmouth,O. P12	132
Rankin,Pa. A7	127
So.Chicago,Ill. R2	127
SparrowsPt.,Md. B2	129
Sterling,Ill. (1) N15	127
Torrance,Calif. C11	147
Worcester,Mass. A7	133

STAPLES, Polished, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	129
Bartonville,Ill. (19) K4	126
Chicago W13	127
Crawfordsville,Ind. M8	128
Donora,Pa. A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
Kokomo,Ind. C16	128
Minnequa,Colo. C10 (45)	123
Monessen,Pa. P7	127
Pittsburg,Calif. C11	145
Portsmouth,O. P12	132
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
SparrowsPt.,Md. B2	128
Sterling,Ill. (1) N15	126
Torrance,Calif. C11	146
Worcester,Mass. A7	132

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$7.80
Wheeling,W.Va. W10	7.80

TIE PLATES

Fairfield,Ala. T2	4.775
Gary,Ind. U5	4.775
Ind.Harbor,Ind. I-2	4.775
Lackawanna,N.Y. B2	4.775
Minnequa,Colo. C10	$56.50*
Pittsburg,Calif. C11	4.925
Seattle B3	4.925
Steelton,Pa. B2	4.775
Torrance,Calif. C11	4.925

* Per net ton.

JOINT BARS

Bessemer,Pa. U5	4.925
Fairfield,Ala. T2	4.925
Ind.Harbor,Ind. I-2	4.925
Joliet,Ill. U5	4.925
Lackawanna,N.Y. B2	4.925
Minnequa,Colo. C10	4.925
Steelton,Pa. B2	4.925

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.65
KansasCity,Mo. S5	6.90
Lebanon,Pa. B2	6.65
Minnequa,Colo. C10	6.65
Pittsburgh,Pa.	6.65
Seattle B3	7.15
So.Chicago,Ill. R2	6.65
Struthers,O. Y1	6.65
Youngstown R2	6.65

RAILS	Std. No. 1	Std. No. 2	All No. 2	Std. Tee 60 lb Under
Bessemer,Pa. U5	3.775	3.675	3.725	4.25
Ensley,Ala. T2	3.775	3.675	....	4.25
Fairfield,Ala. T2	....	....	....	4.25
Gary,Ind. U5	3.775	3.675	3.725	....
Huntington,W.Va. W7	....	....	....	5.25
IndianaHarbor,Ind. I-2	3.775	3.675	3.725	....
Johnstown,Pa. B2	....	....	....	(16) 4.25
Lackawanna,N.Y. B2	3.775	3.675	....	4.25
Minnequa,Colo. C10	$75.50*	$73.50*	....	4.75
Steelton,Pa. B2	3.775	3.675	....	....
Williamsport,Pa. S19	....	....	....	5.00

* Per net ton.

TOOL STEEL

(Prices subject to 4.2% increase)

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
Special Hot Work	0.350
High Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1	-	1.505
18	4	2	-	1.65-1.66
2-2.5	4	2.5	1.6	12 2.5-3.5 3.5-4.5 6-6.5
18	4	2	7	2.460
18	2.5	1	4.75	2.125
18	4	2	5	2.445-2.45
12.5	4	-	-	1.60
9	3.25	0.5	-	1.01

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

FOOTNOTES

(2) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base
(20) 0.25c off for untreated
(21) New Haven, Conn., base
(22) Del. San Francisco Bay area.
(23) 20 Ga.; 36" wide.
(24) Deduct 0.20c, liner than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators, to consumers, 5.05c
(27) Bar mill sizes.
(28) Bonderized.
(29) Add $1.50 per ton.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c
(34) 7.85c for cut lengths.
(35) 22" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035", 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Plus 0.375c per 100 lb.
(43) Plus 4.7% on base and extras.
(44) Plus 45c per 100 lb.
(45) Plus 60c per 100 lb.
(46) Plus 2.2 per cent.

BUTTWELD STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼		1½		2		2½		3	
List Per Ft.	8.5c		11.5c		17c		23c		27.5c		37c		58.5c		76.5c							
Pounds Per Ft.	0.85		1.13		1.68		2.28		2.73		3.68		5.82		7.62							
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	32.5	15.25	35.5	18.25	38	20.75	38.5	20.5	39	21	39.5	21.5	40	21.25	40	21.25						
Alton, Ill. L1 (†)	29.5	10.5	32.5	14.5	35	18	35.5	18.5	36	19.5	36.5	20	37	20.5	37	20.5						
Benwood, W. Va. W10	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22	40	21.75	40	21.75						
Etna, Pa. N2 (†)	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	22.25	39.5	22	40	21.75	40	21.75						
Fontana, Calif. K1 (†)	19.5	0.25	22.5	4.25	25	7.75	25.5	7.5	26	8.5	26.5	9	27	8.75	27	8.75						
Ind. Harbor, Ind. Y1 (†)	31.5	14.25	34.5	18.25	37	21.75	37.5	21	38	22	38.5	22.25	39	21.75	39	21.75						
Lorain, O. N3 (*)	32.5	22.25	35.5	26.25	38	29.75	38.5	27.25	39	28.25	39.5	28.75	40	26.25	40	26.25						
Sharon, Pa. M6	32.5	14.25	35.5	18.25	38	21.25	38.5	20.50	39	21.00	39.5	21.50	40	20.75	40	20.75						
Sparrows Pt., Md. B2	30.5	11.25	33.5	15.25	36	18.75	36.5	18.5	37	19.5	37.5	20	38	19.75	38	19.75						
Youngstown R2 (**)	32.5	16.25	35.5	20.25	38	23.75	38.5	22.75	39	23.75	39.5	24.25	40	23.25	40	23.25						
Youngstown Y1 (‡)	32.5	15.25	35.5	19.25	38	22.75	38.5	22.00	39	23.00	39.5	23.50	40	22.75	40	22.75						
Wheatland, Pa. W9	32.5	13.25	35.5	16.25	38	18.75	38.5	19	39	19.5	39.5	20	40	20.25	40	20.25						

SEAMLESS STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft.	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft.	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Ambridge, Pa. N2	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Lorain, O. N3 (*)	24	12.75	27	12.75	27	12.75	29	14.75	29	14.75	33.75	19.5	33.75	19.5
Youngstown Y1 (‡)	24	7.50	27	9.25	27	9.25	29	11.25	29	11.25	33.75	16	33.75	16

ELECTRIC WELD STANDARD PIPE, T & C

Youngstown, R2 (**)	24	8.25	27	9.75	27	9.75	29	11.75	29	11.75	33.75	16.5	33.75	16.5

BUTTWELD STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1	
List Per Ft.	5.5c		6c		6c		92c		92c		$1.09	
Pounds Per Ft.	0.24		0.42		0.57		9.20		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Benwood, W. Va. W10	29.5	+0.25	23.25	+3.5	17.75	+7.75	33	14.25	33	14.25		
Butler, Pa. F6 (†)	30.5	1.25	25	+1.75	20	+5.5	..	....	..	....		
Etna, Pa. N2 (†)	30.5	1.25	25	+1.75	20	+5.5	33	14.25	33	14.25		
Sharon, Pa. M6 (‡)	29.5	—1.75	23	+2.25	18	+5.25	..	....	..	....		
Sharon, Pa. S4 (†)	30.5	1.25	25	+1.75	20	+5.5	..	....	..	....		
Sparrows Pt., Md. B2	28.5	+0.75	23	+3.75	18	+7.50	..	....	..	....		
Youngstown R2 (**)	....	....	....	....	....	....	33	15.75	33	15.75		
Wheatland, Pa. W9	28.5	+0.75	23	+3.75	18	+7.50	..	....	..	....		

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 12.50c; (**), 11.50c; (*), 5c, with discounts adjusted depending on price of zinc at time of shipment.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft., mill; minimum wall thickness, cut lengths 10 to 24 ft., inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	14.19	16.71-17.77	16.20	16.20
1¼	13	16.97	19.80-21.26	16.46	19.19
1½	13	18.22-18.77	22.08-22.82	18.19	21.41
1¾	13	20.35-21.35	24.92-25.49	20.69	24.35
2	13	22.81-23.93	27.94-28.58	23.19	27.28
2¼	13	25.69-26.66	31.38-32.18	25.84	30.42
2½	12	28.40-29.36	34.55-35.58	28.46	33.50
2½	12	31.28-32.17	37.83-39.19	31.19	36.67
2¾	12	33.87-34.82	40.09-42.44	33.05	38.86
3	12	35.78-36.87	42.11-44.93	34.98	40.82
35.40		110		8.03	
30		65.84.110		8.03	
24		72 to 104		8.03	
17 to 20		34.90		8.03	

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam. 15
- ⅝-in. & ¾-in. 18.5
- ⅞-in. and larger 17.5

Longer than 6 in.:
- All diams. 14

Lag bolts, all diams.:
- 6 in. and shorter 23
- over 6 in. long 21

Ribbed Necked Carriage 18.5
Blank 34
Polw 34
Step, Elevator, Tap and Sleigh Shoe 21
Tire Bolts 21
Boiler & Fitting-Up Bolts 31

NUTS

	H.P. & C.P.	Reg. Hvy.
Square:		
½-in. & smaller	15	15
⅝-in. & ¾-in.	12	6.5
⅞-in.-1½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ¾-in.	16.5	6.5
⅞-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ¾-in.	23	17.5
⅞-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ¾-in.	29.5	22
⅞-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
		Light
⅞-in. & smaller		35
½-in. to ⅝-in.		28.5
¾-in. to 1½-in.		26

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter 38
1 in. and smaller diam. x over 6 in. 26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 35
¼-in. diam. & larger 16
N.F. thread, all diams. 10

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish 48 & 10
Plated finishes 31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ⅝-in. & smaller 42
- ¾-in. through 1 in. 34

Longer than 6 in.:
- ⅝-in. and smaller 26
- ¾-in. through 1 in. 4

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in. larger 8.50c
⅞-in. under 30 off

ELECTRODES

(Threaded, with nipples, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95

CARBON

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98+% Fe, annealed	18.00
Unannealed	14.50
Swedish, c.l.f. N.Y., c.l., in bags	10.90
Electrolytic iron:	
Annealed, 99.5% Fe	42.50
Unannealed (99+% Fe)	36.50
Unannealed (99+% Fe) (minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	.83.00-148.00
Aluminum:	
Carlots, freight allowed	31.00
Atomized, 500 lb drums, freight allowed	33.00
Antimony, 500 lb lots	71.00
Brass, 20-ton lots	31.00-34.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 20-ton lots	50.00
Copper:	
Electrolytic	37.25
Reduced	35.25
Lead	7.50*
Magnesium	75.00-85.00
Manganese:	
Minus 100 mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver 5-ton lots	46.00
Silicon	38.50
Solder	8.50*
Stainless Steel, 302	83.00
Zinc, 10-ton lots	18.00-31.00
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	5.85
Less than 1000 lb	6.00
Molybdenum: 99.9%, minus 200 mesh	3.24
Chromium, electrolytic 99.9% Cr min.	3.50

* Plus cost of metal

STAINLESS STEEL

(Add 4.7% to extras where new extra cards have not been issued)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	44.25	36.50	33.75
302	44.50	39.75	34.00
303	46.50	43.50	36.50
304	46.50	41.75	35.50
309	60.50	59.25	48.25
316	61.50	63.50	53.00
321	53.00	52.00	40.00
347	58.00	56.50	44.75
410	39.00	32.75	27.50
416	40.00	40.00	28.00
420	47.00	50.25	33.50
430	41.50	33.25	28.00
501	29.25	27.75	15.25

Balt., Types 301-347 and 430 sheets, except 303 and 309 E2.

Brackenridge, Pa. sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa. sheets and strip except Types 303, 309, 416 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire except 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Harrison, N. J., wire, Type 302, 33.00c; Type 304, 34.50c; Type 316, 51.50c, including 4.7% increase.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5

Muncie, Ind., wire 1-7 quotes types 302, 304, 430.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip except Types 303, 309, 416, 501 502 and 34.25c on Type 301 S3.

So. Chicago, bars, shapes U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & wire A7.

West Leechburg, strip A4.

Youngstown, strip C8.

CLAD STEELS

(Cents per pound; add 4.7% to base price and extras)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Copper Base Both Sides
302	....	....	19.75	26.24-27.50	77.00
304	25.00	29.50	24.50	27.50-27.77	77.00
309	30.50	35.00	....	....	....
310	36.50	41.00	....	....	144.00
316	29.50	34.00	26.00	35.92-36.50	....
317	34.50	39.00	....	....	....
318	33.50	38.00	....	....	....
321	26.50	31.00-32.00	23.00	33.00	111.00
347	27.50	32.00	24.00	33.50-33.83	130.00
405	21.25	27.75	....	....	....
410	20.75	27.25	....	....	....
Nickel	33.55	45.15	....	....	165.00
Inconel	41.23	54.18	....	....	....
Monel	34.93	46.28	....	44.00	....
Copper*	....	....	....	....	....

Strip Carbon Base	Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Nickel	41.00	54.00	....	....
Copper*	23.70	26.65	20.20	24.40

* Deoxidized. Production points: Stainless plates, sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, arnegie, Pa. S18; Production point for copper-base sheets is Carnegie, Pa. A13.

PENN BUCKETS

No. 4-A
Self Dumping

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Welded construction prevents "clinging" makes them empty easily and completely

WRITE TODAY FOR NEW BULLETIN DIMENSION SHEET AND PRICE LIST

PENN IRON WORKS, INC.
READING, PENNA.

"SEE WHAT
WHITEHEAD
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STAMPINGS"

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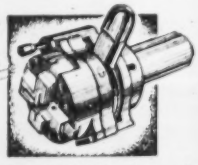

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Pig Iron . . .

(*Continued from page 167*)

here of possible freight equalization by Buffalo pig iron producers in view of the generally easier market tone. This, it is pointed out, would mean an average absorption of around $4 per ton. At present, such a move doesn't seem probable but partial absorption may be possible.

Cincinnati — Merchant pig iron business has undergone little change here. Mills are selling all the iron they produce. Demand from the machine tool industry is holding up well. The situation with jobbing foundries is spotty.

St. Louis—This area's two blast furnaces have shifted 100 per cent to basic pig production, foundry iron output having caught up with demand probably until July 1.

Seattle—Foundry operators anticipate a satisfactory season. Private construction and defense work are being reflected in demand for castings. Considerable Australian pig iron has been purchased by consumers in this area. One sizable tonnage was placed at $58.50 per gross ton, c. i. f. Seattle. This is approximately $5 under the going domestic market.

Iron Ore . . .

Iron Ore Prices, Page 171

Cleveland—The lake iron ore shipping season of 1953 is getting away to a fast start. Marking one of the earliest season openings in years, the fleet already has hauled down from upper lake ports 1,139,569 gross tons. In the week ended Apr. 6 the movement was 1,080,470 tons, according to the Lake Superior Iron Ore Association. Total movement to Apr. 6 this season is more than 1 million tons ahead of that in the like period in the 1952 season. Goal for the 1953 season is placed in excess of 100 million tons. Last week lake carriers were passing through the Soo at the rate of about 1 per hour.

Agreements have been entered into with several shippers on a new schedule of lake freight rates for transportation of iron ore in the 1953 shipping season. The new rates are: From head of Lake Superior to lower lake ports, $1.60 per gross ton; Marquette to lower lake ports, $1.44; Escanaba to Lake Erie, $1.20; Escanaba to Lake Michigan, 96 cents. These rates are 5 cents per ton above those in effect at the end of the 1952 shipping season. Shipping rates on limestone also are up 5 cents per ton.

Scrap . . .

Scrap Prices, Page 176

Philadelphia—Steel scrap prices are more stable. Most mills closed on some tonnage over the past several days. There has been no attempt, however, to place particularly large tonnage, even though inventories are limited. Consumers appear confident with spring at hand they will have little difficulty keeping abreast of requirements. There is a slight easing in No. 1 bundles to a spread of $44 to $45 delivered, in mixed borings and turnings to $35 to $36, and in short shovel turnings to $36 to $37. Drop broken machinery is holding at $49 to $50, which grade was erroneously quoted in these columns at $40 to $50 last week due to typographical error.

Pittsburgh—Scrap is moving at a snail's pace. One reason advanced for this was the Union railroad strike. Scrap intended for the mills served by this road went to other works with the result these latter became topheavy on inventory. Jones & Laughlin Steel Corp. held up shipments for about 15 days to enable it to absorb the extra tonnage received during the strike. Some low phos grades are moving above ceilings. In a week marked by sluggish activity, the principal price move noted is a drop of $1 on short shovel turnings on a sale at $34 to $35.

Boston—Weaker prices for No. 2 bundles and borings and turnings mark the steel scrap price structure. Short shoveling turnings are included in the weakness. While steel scrap is moving steadily against old contracts, new buying is slow.

New York—Scrap brokers have dropped their prices on No. 2 heavy melting steel to $32.50 to $33.50 and on unstripped motor blocks to $28, the latter being a sharp drop of more than $4 a ton. All other prices are unchanged.

Buffalo—Weaker tendencies and lower prices dominate the scrap market here. Prices on No. 1 heavy melting dropped $2 per ton while No. 2 heavy melting and No. 2 bundles slumped $1.50. New business is reported at the lower prices.

Cleveland—With new mill purchases absent, and rejections against shipments on old contracts high, the market on steel scrap is showing signs of the jitters. Dealers fear a pile up of material in their yards unless the mills re-enter the market actively soon and ease up on their quality restrictions. Meanwhile, prices are tending downward sharply. In the absence of a representative mill purchase prices are nominal but, based on brokers' offers to dealers of $39 on track for No. 1 heavy melting steel are lower. This brings the delivered price to mills to a range of $41.50 to $42.50, though brokers insist the former price range of $44 to $44.50 still prevails in the absence

(*Turn to page 178*)

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IRON AND STEEL SCRAP

Open market prices as reported to STEEL, gross tons, except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Apr. 9	$43.33
Apr. 2	43.75
Mar. avg.	44.13
Apr., 1952	43.00
Apr., 1948	40.41

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH
(Including brokers' Commission)

No. 1 heavy melting	**44.00***
No. 2 heavy melting	42.00*
No. 1 bundles	44.00*
No. 2 bundles	40.00*
No. 1 busheling	44.00*
Machine shop turnings	**30.00-31.00***
Mixed borings, turnings	32.00-33.00*
Short shovel turnings	*34.00-35.00**
Cast iron borings	34.00-35.00*
Cut structurals	**50.00-51.00***
Heavy turnings	**44.00***
Punchings & plate scrap	50.00-51.00*
Electric furnace bundles	**46.00***

Cast Iron Grades
(Delivered)

No. 1 cupola	47.00-48.00
Charging box cast	44.00-45.00
Heavy breakable cast	43.00-44.00
Unstripped motor blocks	40.00-41.00
No. 1 machinery cast	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00
Rails, 2-ft. and under	57.00-58.00
Rails, 18-in. and under	58.00-59.00
Rails, random lengths	53.00-54.00
Railroad specialties	55.50-56.50

*Plus applicable freight spring-boards from other areas.

CLEVELAND
(Delivered consumer plant; including broker's commission)

No. 1 heavy melting	*41.50-42.50**
No. 2 heavy melting	*40.50-41.50**
No. 1 bundles	*41.50-42.50**
No. 2 bundles	*39.50-40.00**
No. 1 busheling	*41.50-42.00**
Machine shop turnings	*29.00-30.00**
Mixed borings, turnings	*32.00-33.00**
Short shovel turnings	*32.00-33.00**
Cast iron borings	*32.00-33.00**
Low phos.	*48.00-49.00**
Alloy free, short shovel turnings	36.00-37.00*
Electric furnace bundles	46.00-46.50*

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	46.00-47.00
Stove plate	45.00-46.00
Heavy breakable cast	44.00-45.00
Unstripped motor blocks	38.00-38.50
Brake shoes	40.00-41.00
Clean auto cast	52.00
No. 1 wheels	46.00-47.00
Burnt cast	40.00-41.00
Drop broken machinery	49.00

Railroad Scrap

No. 1 R.R. heavy melt.	**46.00-47.00**
R. R. Malleable	**50.00-51.00**
Rails, 3-ft. and under	58.00-60.00
Rails, 18-in. and under	61.00-62.00
Rails, random lengths	56.00
Cast steel	51.00-52.00
Railroad specialties	51.00-52.00
Uncut tires	52.00-53.00
Angles, splice bars	54.00-55.00
Rails, rerolling	56.00

*Plus applicable freight spring-boards from other areas. Prices on steel grades are nominal.

YOUNGSTOWN
(Delivered consumer plant; including broker's commission)

No. 1 heavy melting	*41.50-42.00**
No. 2 heavy melting	*40.50-41.00**
No. 1 bundles	*41.50-42.00**
No. 2 bundles	*39.50-40.00**
Machine shop turnings	*29.00-30.00**
Short shovel turnings	32.00-33.00*
Cast iron borings	32.00-33.00*
Low phos.	*48.00-49.00**
Electric furnace bundles	47.00-47.50*

Railroad Scrap

No. 1 R.R. heavy melt.	**46.00-47.00**

*Plus applicable freight spring-boards from other districts. Prices on steel grades are nominal.

NEW YORK
(Brokers' Buying Prices)

No. 1 heavy melting	37.00
No. 2 heavy melting	*42.50-43.50*
Machine shop turnings	24.00
Mixed borings, short turnings	27.00-28.00
Low phos. structural & plate	40.00-40.50
Shovel turnings	27.00-28.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Unstripped motor blocks	*28.00*

PHILADELPHIA
(Delivered consumer plant)

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	40.00-41.00
No. 1 bundles	*44.00-45.00*
No. 2 bundles	38.00-39.00
No. 1 busheling	44.00-45.00
Machine shop turnings	*31.50-32.00*
Mixed borings, turnings	*35.00-36.00*
Short shovel turnings	*36.00-37.00*
Structurals & Plate	47.50-48.50
Heavy turnings	42.50-43.50
Couplers, springs, wheels	52.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Charging box cast	45.00
Heavy breakable cast	45.00-46.00
Unstripped motor blocks	33.00-34.00
Drop broken machinery	49.00-50.00

CINCINNATI
(Delivered)

No. 1 heavy melting	45.50
No. 2 heavy melting	42.00
No. 1 bundles	45.50
No. 2 bundles	40.00
No. 1 busheling	45.50
Machine shop turnings	*30.00*
Mixed borings, turnings	31.00*
Short shovel turnings	*31.00**
Cast iron borings	31.00*
Structural & plate, 3 ft	47.00

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	40.00
Stove plate	36.00*
Burnt cast	36.00*
Heavy breakable cast	38.00
Unstripped motor blocks	34.00
Brake shoes	37.00*
Clean auto cast	43.00
Drop broken machinery	49.00

Railroad Scrap
(Delivered)

No. 1 R.R. heavy melt.	46.00-47.00
Malleable	49.00-50.00
Rails, 18-in. and under	59.00-60.00
Rails, random lengths	*47.00*
Rails, rerolling	52.00

*F.o.b. shipping point

DETROIT

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	37.50-38.00
No. 1 bundles	40.00-41.00
No. 2 bundles	34.50-35.00
No. 1 busheling	**40.00-41.00**
Machine shop turnings	24.50-25.00
Mixed borings, turnings	*26.00-26.50*
Short shovel turnings	*26.00-26.50*
Punchings & plate scrap	44.00-46.00

Cast Iron Grades

No. 1 cupola	47.50
Charging box cast	**40.00-42.00**
Stove plate	43.00-44.00
Unstripped motor blocks	33.00
Clean auto cast	50.00
Malleable	48.00

BUFFALO

No. 1 heavy melting	*$45.50-46.50*
No. 2 heavy melting	*41.50-42.00*
No. 2 bundles	*39.50-40.00*
No. 1 bundles	43.00-44.00
No. 1 busheling	43.00-44.00
Machine shop turnings	32.00-32.50
Mixed borings, turnings	36.00-36.50
Short shovel turnings	36.50-37.00
Low phos.	48.50-49.00

Cast Iron Grades
(F.o.b. Shipping Point)

No. 1 cupola	42.50-43.00
Drop broken machinery	45.50-46.00

BOSTON
(Brokers' Buying Prices; f.o.b. shipping points)

No. 1 heavy melting	34.17
No. 2 heavy melting	*32.17*
No. 1 bundles	34.17
No. 2 bundles	*30.17*
Machine shop turnings	22.17-23.17
Mixed borings, turnings	*21.17*
Short shovel turnings	*28.17*
No. 1 cast	34.00-35.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	46.00-47.00

CHICAGO
(Including broker's commission)

No. 1 heavy melting	*41.00-42.00**
No. 2 heavy melting	41.00-43.00*
No. 1 bundles	43.50-44.00*
No. 2 bundles	38.50-39.00*
No. 1 busheling	*42.50-43.00**
Machine shop turnings	*25.00**
Mixed borings, turnings	*25.00**
Short shovel turnings	*27.00**
Cast iron borings	*25.00**
Cut structurals	47.00-48.00*
Electric furnace bundles	45.50-46.00*

Cast Iron Grades

No. 1 cupola	43.00-45.00
Stove plate	*38.00-40.00*
Unstripped motor blocks	38.00-40.00
Clean auto cast	48.00-50.00
Drop broken machinery	46.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-48.00
R.R. Malleable	*45.00-47.00*
Rails, 2-ft. and under	55.00-57.00
Rails, 18-in. and under	57.00-59.00
Angles, splice bars	52.00-54.00
Rails, rerolling	*55.00*

*Plus applicable freight spring-boards from other areas.

BIRMINGHAM

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	36.00-37.00
No. 1 bundles	37.00-38.00
No. 2 bundles	34.00-35.00
No. 2 busheling	35.00-36.00
Machine shop turnings	26.00-27.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	30.00-31.00
Cast iron borings	30.00-31.00
Cut structurals	41.00-42.50
Heavy turnings	38.00
Punchings & plate scrap	41.00-41.50
Electric furnace bundles	39.00-40.00

Cast Iron Grades
(F.o.b. Shipping Point)

No. 1 cupola	42.00-43.00
Charging box cast	35.00-36.00
Stove plate	38.00-39.00
Heavy breakable cast	*$3.00-$4.00*
Unstripped motor blocks	*$4.00-$5.00*
Brake shoes	41.00
Clean auto cast	52.00
No. 1 wheels	46.00-47.00
Burnt cast	41.00
Drop broken machinery	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Malleable	nom.
Rails, 2-ft. and under	46.00-47.00
Rails, 18-in. and under	*46.00-47.00*
Rails, random lengths	*42.00-43.00*
Cast steel	44.00
Uncut tires	43.00
Angles, splice bars	*46.00-47.00*
Rails, rerolling	46.00-47.00

ST. LOUIS
(Brokers' Buying Prices)

No. 1 heavy melting	*39.00*
No. 2 heavy melting	*38.00*
No. 1 bundles	*40.00*
No. 2 bundles	*37.00*
Machine shop turnings	*27.00-28.00*
Short shovel turnings	*29.00-30.00*

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Charging box cast	39.00-41.00
Heavy breakable cast	36.00-38.00
Unstripped motor blocks	33.00-35.00
Brake shoes	41.00
Clean auto cast	46.00-47.00
Burnt cast	37.00-39.00

Railroad Scrap

Malleable	40.00
Rails, 18 inch and under	*58.00-60.00*
Rails, random lengths	50.00-52.00
Uncut tires	46.00-48.00
Angles, splice bars	48.00-49.00
Rails, rerolling	50.00

SEATTLE
(Delivered consumer plant)

No. 1 heavy melting	*28.00*
No. 2 heavy melting	*29.00*
No. 1 bundles	*32.00*
No. 2 bundles	*26.00*
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Short shovel turnings	15.00
Electric furnace, No. 1	40.00-41.00

Cast Iron Grades
(F.o.b. Shipping Point)

No. 1 cupola	40.00
Heavy breakable cast	36.00-38.00
Unstripped motor blocks	*29.00*
No. 1 wheels	*38.00-40.00*

Railroad Scrap

Rails, random lengths	*38.00*

SAN FRANCISCO

No. 1 heavy melting	30.00
No. 2 heavy melting	26.00
No. 1 bundles	29.00
No. 2 bundles	24.00
No. 1 busheling	30.00
Machine shop turnings	12.00
Mixed borings, turnings	29.00
Short shovel turnings	29.00
Cast iron borings	29.00
Cut structurals	38.00
Heavy turnings	34.00
Punchings & plate scrap	37.50
Electric furnace bundles	37.00

Cast Iron Grades

No. 1 cupola	*38.00*
Charging box cast	42.00
Stove plate	46.00
Heavy breakable cast	45.00
Unstripped motor blocks	41.00
Brake shoes	41.00
Clean auto cast	52.00
No. 1 wheels	47.00
Burnt cast	41.00
Drop broken machinery	52.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00
Malleable	55.00
Rails, 3-ft. and under	42.00
Rails, 18-in. and under	45.00
Rails, random lengths	39.00
Cast steel	40.00
Uncut tires	39.00
Angles, splice bars	42.00
Rails, rerolling	44.00

LOS ANGELES

No. 1 heavy melting	30.00
No. 2 heavy melting	26.00
No. 1 bundles	29.00
No. 2 bundles	24.00
Machine shop turnings	12.00

Cast Iron Grades
(F.o.b. Shipping Point)

No. 1 cupola	38.00-41.00

HAMILTON, ONT.
(Delivered Prices)

Heavy Melt	$35.50
No. 1 Bundles	35.50
No. 2 Bundles	35.50
Mechanical Bundles	31.50
Mixed Steel Scrap	31.50
Mixed Borings, Turnings	28.50
Rails, Remelting	35.50
Rails, Rerolling	38.50
Busheling	28.00
Busheling new factory: Prep'd	33.50
Unprep'd	31.50
Short Steel Turnings	28.50

Cast Iron Grades†

No. 1 Machinery Cast	50.00

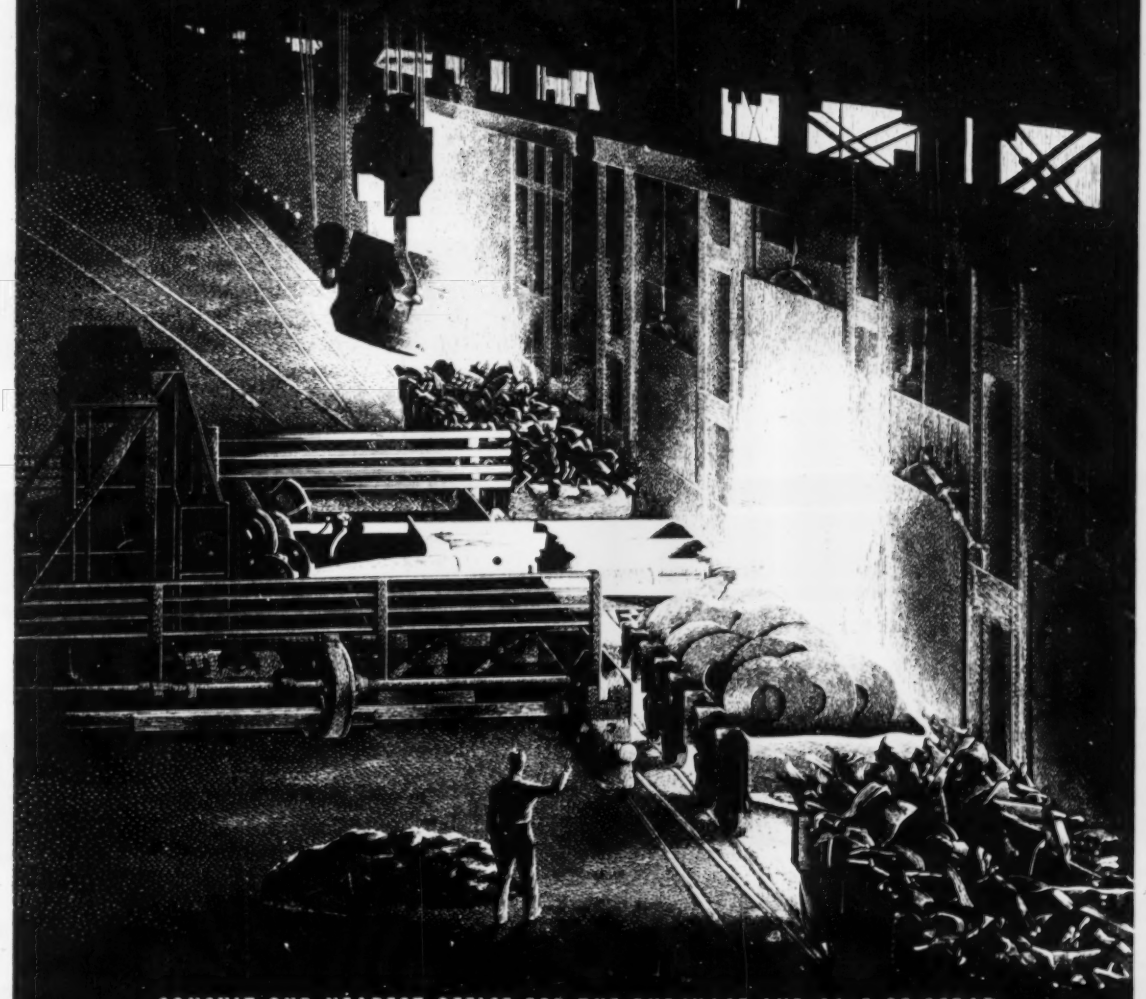
† F.o.b., shipping point.

OLD CEILING BASE PRICES

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Grade 1 Basing Point	No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	**43.00**	**45.00**
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00

for the purchase or sale of | *scrap*



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Scrap . . .

(Continued from page 175)

of a firm buy.

Detroit—Orders for turnings are tending to cushion the drop anticipated in prices, but a decline to around $20 is expected about May 1. Mills are more critical of scrap received.

Youngstown — Some large scrap consumers are back in the market in a small way but they are replenishing inventories with a watchful eye on the price trend.

Cincinnati — Trading is quiet. Demand has weakened and supplies are adequate in all grades. Since the mills have done most of their buying for the next 30 days, no fluctuation in prices is anticipated for the next week or so.

Chicago—Top grades of open-hearth scrap like No. 1 heavy melting and No. 1 bundles enjoy good demand but most other grades are sluggish. Dealers' stocks are increasing as outlying areas ship promptly under the influence of a sagging price trend. Recent purchase by an important mill has established lower prices on turnings. Machine shop turnings were bought for $25, delivered, including commission, and short shoveling turnings for $27. The former is down $2 to $3 and the latter $1 to $2. Scrap inventories are substantial despite heavy consumption.

St. Louis Scrap buying by mills started cautiously last week, the first new orders since decontrol being placed.

San Francisco No. 1 cupola cast, reflecting something of a scarcity, moved up slightly to $38 a ton delivered last week. Steel grades continue unchanged with deliveries slow.

Seattle — The scrap market advanced $3 per ton last week. According to the leading buyer, No. 1 heavy melting steel increased from $30 to $33.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2400 tons, Washington state Chehalis river bascule span, to Pacific Car & Foundry Co., Seattle; MacRae Bros., Seattle, general contractors, low $3,364,025.

795 tons, Hickory Creek bridge, railroad relocation, Denton county, Tex., Corps of Engineers, to Maxwell Steel Co., Ft. Worth, Tex.; Austin Bridge Co., Dallas, general contractor; also 725 tons, H-bearing piles

FOUNDRY EQUIPMENT
MACHINE SHOP & REAL ESTATE
TO BE SOLD AT
PUBLIC AUCTION
THURSDAY, MAY 14, 11 A. M. (E.S.T.)
ON THE PREMISES OF
PITTSBURGH MILL STEEL CO.
4500 EAST LOMBARD ST.,
BALTIMORE, MD.

$1,500,000 REPLACEMENT VALUE
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to Tennessee Coal & Iron Division, U. S. Steel Corp.; and 65 tons, reinforcing bars to Southern States Steel Co., Dallas, Tex.

600 tons, New York state thruway, bridge, Albany county, New York; to Ernst Iron Works, Buffalo; D. V. Frione & Co., New Haven, Conn., general contractor.

500 tons, partial requirements, terminal market, Boston; to Grossier & Schlager Iron Works, Somerville, Mass.

324 tons, warehouse, U. S. armory, Springfield, Mass.; to Haarmann Structural Steel Co., Holyoke, Mass.; E. F. Carlson Co., Springfield, general contractor.

350 tons, maintenance hangar, naval air station, Key West, Fla.; to B. L. Montague, Sumter, S. C.; Henry C. Beck Co., Atlanta, Ga., general contractor.

250 tons, two maintenance shops, Ladd air field, Alaska, to Leckenby Structural Steel Co., Seattle; Grove, Shepherd, Wilson & Kruge Inc., Seattle, general contractor.

125 tons, steel decking, Chehalis river state span, to M. M. Mossman, Seattle, for Reliance Steel Products Co., McKeesport, Pa.

[illegible] tons, 2-span rolled beam bridge with overall skew span, Wilton-Redding, Conn.; to American Bridge Division, U. S. Steel Corp., Pittsburgh; Mariani Construction Co., New Haven, general contractor.

100 tons, 100-ton traveling crane for Dexter dam, Oregon, to Cyclops Iron Works, San Francisco, low $88,512, by U. S. Engineer, Portland, Ore.

STRUCTURAL STEEL PENDING

4000 tons, bridge, District of Columbia Commission, Washington; bids open Apr. 9, following a postponement; approximately 1000 tons of affiliated work will be up for bids later.

3000 tons, plant for Anaconda Aluminum Co., Flathead, Mont.; bids in.

2400 tons, addition to state hospital, Philadelphia, opening of bids postponed until May 6.

1500 tons, state highway bridge, York county, Pennsylvania; bids Apr. 24.

1200 tons, state highway bridge, Penobscot river, Bangor-Brewer, Me.; bids Apr. 29, Maine State Highway Commission, Augusta, Me.

990 tons, 385-foot, 3-span riveted plate girder bridge, Shetucket river, relocation route 12, Norwich, Conn.; bids Apr. 20, Hartford, Conn.

165 tons, Snake river plate girder bridge, bids to Bureau of Reclamation, Denver, May or June.

[illegible] tons, police station, Hartford, Conn.; Southern New England Construction Co., Hartford, low.

200 tons, hoisting machinery, Lucky Peak dam, Moffitt Engineering Co., Albany, Calif., low $99,400, to U. S. Engineer, Walla Walla, Wash.

160 tons, bridge, Manchester, N. H.; Harvey Construction Co., Manchester, low.

130 tons, shop addition, Bullard Co., Bridgeport, Conn.

100 tons, draft tube gantry crane, Chief Joseph dam powerhouse; Star Iron & Steel Co., Tacoma, low $42,930, to U. S. Engineer, Seattle.

100 tons, penstock, stoplogs, etc., Lookout Point dam, Oregon; Weldrite Steel Co., Inc., Bellingham, Wash., apparently low $43,171 to U. S. Engineer, Portland.

100 tons, three seal radial gates, Tiber dam, Montana; bids to Denver, Apr. 28.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1000 tons, municipal stadium, Baltimore, to Bethlehem Steel Co.

600 tons, bars and mesh, highway and culverts, Wilbur Cross highway, route 15, Connecticut; to Plantations Steel Co., Providence, R. I., and Wickwire-Spencer Division, Colorado Fuel & Iron Corp., New York.

M. A. Gammino Construction Co., Providence, general contractor.

495 tons, Washington state Fox Island bridge, to Bethlehem Pacific Coast Steel Corp., Seattle; Manson Construction & Engineering Co., Seattle, general contractor.

300 tons, maintenance hangar, air field base, Key West, Fla., to Virginia Steel Co., Birmingham, Ala.; Henry C. Beck Co., Atlanta, Ga., general contractor.

140 tons, training school, U. S. Engineers, Ft. Holabird, Md., to Capitol Steel Corp. of New York, Brooklyn, N. Y.

235 tons, addition, fire control unit, Aberdeen, Md., to Capitol Steel Corp. of New York, Brooklyn, N. Y.

200 tons, laboratory, Camp Detrick, Md., to Capitol Steel Corp. of New York, Brooklyn, N. Y.

125 tons, Holy Trinity school and convent, Glenburnie, Md., to Bethlehem Steel Co.

REINFORCING BARS PENDING

20,000 tons, estimated, bars and piling, substructure, Straits of Mackinac bridge, Michigan; Merritt-Chapman & Scott Corp., New York, general contractor.

[illegible] tons, substructure, Sakonnet river bridge, Portsmouth-Tiverton, R. I.; Whaling City Dredge & Dock Corp., Groton, Conn., low.

175 tons, 110-mile canal laterals, Columbia Basin project; bids to Bureau of Reclamation, Denver, late April.

150 tons, various Washington state highway projects; bids in.

116 tons, state garden parkway, contract No. 11, section 16, Burlington and Ocean counties, New Jersey; bids opened by State Highway Authority, Trenton, Apr. 23.

110 tons, Snake river bridge, Palisades project; bids to Bureau of Reclamation, Denver, May or June.

PLATES . . .

PLATES PLACED

[illegible] tons, municipal water storage tank, St. Joseph, Mo.; to Hammond Iron Works, Warren, Pa.

100 tons plus, supplementary contract for plant tanks, Ketchikan Pulp Co., Alaska, to Chicago Bridge & Iron Co., Chicago.

PIPE . . .

CAST IRON PIPE PLACED

[illegible] tons, Water District No. 42, Seattle, to H. G. Purcell, Seattle; for U. S. Pipe & Foundry Co., Burlington, N. J.

100 tons, system improvement, Moses Lake, Wash.; to Pacific States Cast Iron Pipe Co., Seattle; Shoreline Construction Co., general contractor.

CAST IRON PIPE PENDING

418 tons, 20-inch, system expansion; bids to Bellingham, Wash., Apr. 6.

350 tons, 25,000 feet plus, 12 to 4 in., also fittings; bids, also alternatives, to Wiles Crook, city clerk, Renton, Wash., Apr. 14.

STEEL PIPE PENDING

500 tons (estimated), 16,000 feet 24 to 12 in. water mains; bids to K. B. Moss, city clerk, Walla Walla, Wash., Apr. 8.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Central of Georgia, one 1600-hp diesel road switcher, to Electro Motive Division, General Motors Corp., La Grange, Ill.

Chicago Burlington & Quincy, 33 diesel units, to Electro Motive Division, General Motors Corp., La Grange, Ill.; list comprises four two-unit 4500-hp passenger locomotives and five two-unit 3000-hp and fifteen 1500-hp road switchers.

Detroit, Toledo & Ironton, two 1500-hp general purpose diesel engines, to Electro Motive Division, General Motors Corp., La Grange, Ill.

Illinois Central, 37 diesel units, comprising thirty-five 1500-hp road switchers and two 2250-hp passenger units, to Electro Motive Division, General Motors Corp., La Grange, Ill.

Mississippi Central, ten 1200-hp diesel switchers, to Electro Motive Division, General Motors Corp., La Grange, Ill.

Union Pacific, ten 1500-hp diesel electric road switching units, to Electro Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Norfolk & Western, 1000 seventy-ton gondolas, to own shops at Roanoke, Va.; Bessemer & Lake Erie, 200 seventy-ton ore cars, to Greenville Steel Car Co., Greenville, Pa.

Advertising Index

Acme Steel Co. 11
Aetna-Standard Engineering Co., The Inside Back Cover
Ajax Electric Co., Inc. 13
Alan Wood Steel Co. 146
Allis-Chalmers Inside Front Cover
Aluminum Company of America 48, 49
American Bridge Division, United States Steel Corporation 51
American Broach & Machine Co., A Division of Sundstrand Machine Tool Co. 143
American Chain & Cable, American Chain Division 167
American Forge & Manufacturing Co. 100
American Gas Furnace Co. 101
American Machine & Foundry Co. 94
American MonoRail Co., The 79
American Screw Co. 26
American Steel & Wire Division, United States Steel Corporation 33
American Welding & Manufacturing Co., The 54
American Zinc, Lead & Smelting Co. 151
American Zinc Sales Co. 151
Amplex Manufacturing Co. 127
Armstrong-Blum Mfg. Co. 57
Atlantic Screw Works, Inc. 26

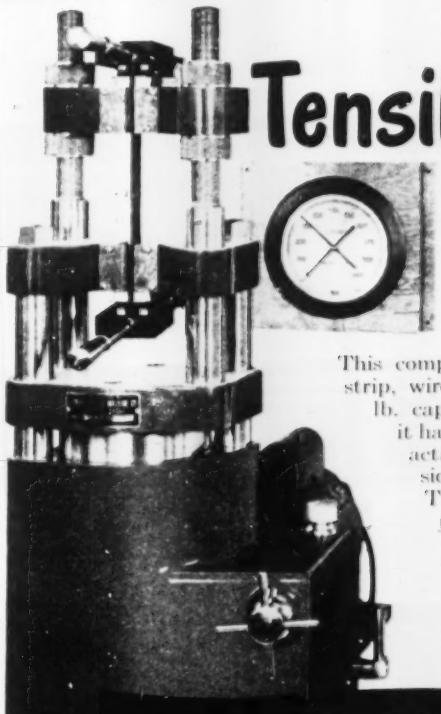
Bakelite Co., A Division of Union Carbide & Carbon Corporation 99
Baker Brothers, Inc. 44
Baker-Raulang Co., The 71
Belmont Iron Works, The 170
Bethlehem Steel Co. 1
Bixby, R. W., Inc. 179
Blake & Johnson Co., The 26
Bliss, E. W., Co. 29
Boston Gear Works 34, 35
Brad Foote Gear Works, Inc. 25
Bridgeport Brass Co. 118, 119
Bunting Brass & Bronze Co., The 165

Cadman, A. W., Mfg. Co. 174
Carpenter Steel Co., The, Alloy Tube Division 42
Central Screw Co. 26
Chemical Corporation, The 5
Chemsteel Construction Co., Inc. 175
Chicago Electric Co. 178
Cincinnati Milling Machine Co., The 72
Cincinnati Shaper Co., The 22, 23
Cleveland Crane & Engineering Co., The, Cleveland Tramrail Division 145
Cleveland Metal Abrasive Co., The 155
Cleveland Steel Tool Co., The 174
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 145
Cleveland Welding Co., The 94
Clinton Machine Co., Metalmaster Division 32
Columbia-Geneva Steel Division, United States Steel Corporation 33
Columbus McKinnon Chain Corporation 98
Commercial Contracting Corporation 162
Continental Screw Co. 26
Cowles Tool Co. 170
Crucible Steel Company of America 166

De Laval Steam Turbine Co. 96
Detroit Steel Corporation, Reliance Steel Division 58
Detroit Testing Machine Co. 181
Dings Magnetic Separator Co. 28
Dravo Corporation 161

Eagle Lock Co., The 26
Eastern Machine Screw Corporation, The 174
Eastman Kodak Co., X-ray Division 115
Easton Car & Construction Co. 160
Eaton Manufacturing Co., Foundry Division 4
Elco Tool & Screw Corporation 26
Electric Controller & Mfg. Co., The 104

Continued on following page



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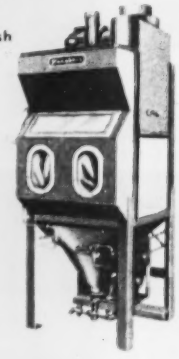

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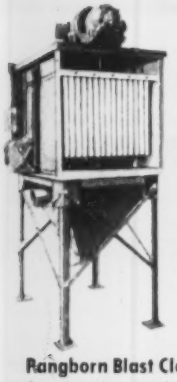
AND DUST CONTROL



Pangborn Unit Dust Collector Traps dust at the source. Machine wear and tear is minimized, housekeeping and maintenance costs reduced. Solves many grinding and polishing nuisances and allows reclamation of valuable material. Models from . . . **$286** and up.

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Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment

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Advertising Index

Concluded from preceding page

Electric Equipment Co. 178
Electric Storage Battery Co., The 130, 131

Fairbanks, Morse & Co. 37
Federal-Mogul Corporation 17
Foster, Frank B., Inc. 179
Foster, L. B., Co. 178

General Electric Co. 53
Gerrard Steel Strapping Division, United States Steel Corporation 157
Giddings & Lewis Machine Tool Co. 14, 15
Gordon, Claud S., Co. 6
Great Lakes Screw Corporaation 26
Great Lakes Steel Corporation 76

Hamilton Tool Co., The 27
Hanlon-Gregory Galvanizing Co. 95
Harnischfeger Corporation, Welding Division 128, 129
Harper, H. M., Co., The 26
Hartford Special Machinery Co., The 144
Heald Machine Co., The 2
Heppenstall Co. 84
Hobart Brothers Co. 9
Horsburgh & Scott Co., The 102
Hubbard, M. D., Spring Co. 174
Hunt, C. B., & Son, Inc. 89

Inland Steel Co. 62
Iron & Steel Products, Inc. 179

James, D. O., Gear Manufacturing Co. 93
Johnson Bronze Co. 97
Jones & Laughlin Steel Corporation 135

Kemp, C. M., Mfg. Co. 30
Kenilworth Steel Co., The 83

Laminated Shim Co., Inc. 124
Lamson & Sessions Co., The 26
Lees-Bradner Co., The 43
Luria Brothers & Co., Inc. 177

McGill Manufacturing Co., Inc. 137
Manheim Manufacturing & Belting Co. 142
Markal Co. 160
Mathews Conveyer Co. 162
Meehanite Metal Corporation 90
Metalmaster Division of Clinton Machine Co. 32
Metal Treating Institute 46
Michigan Crane & Conveyor Co. 181
Murray-Way Corporation, The 158

National Acme Co., The 40, 41
National Carbon Co., A Division of Union Carbide & Carbon Corporation 170
National Forge & Ordnance Co. 20
National Lock Co. 26
National Screw & Manufacturing Co., The 26
National Steel Corporation 76
Nicholson File Co. 139

Ohio Ferro-Alloys Corporation 163
Ohio Locomotive Crane Co., The 174
Osborn Manufacturing Co., The 3

Pacific Tube Co. 47
Pangborn Corporation 182
Parker-Kalon Corporation 26
Penn Iron Works, Inc. 174
Pennsylvania Flexible Metallic Tubing Co. 52
Peters-Dalton, Inc. 123
Pheoll Manufacturing Co. 26
Pioneer Engineering & Manufacturing Co., Inc. 156
Pittsburgh Engineering & Machine Co. 125
Pollack, William B., Co., The 8

Reading Crane & Hoist Corporation 12
Ready-Power Co., The 10
Reed Engineering Co. 16
Reliance Steel Division, Detroit Steel Corporation 58
Republic Steel Corporation 39
Revere Copper & Brass, Inc. 111
Rockford Screw Products Co. 26
Roebling's, John A., Sons Corporation 103
Russell, Burdsall & Ward Bolt & Nut Co. 87
Ryerson, Joseph T., & Son, Inc. 61

Scovill Manufacturing Co. 26
Screw Research Association 26
Shakeproof Div. of Illinois Tool Works 26
Sharon Steel Corporation 80
Shenango-Penn Mold Co. 132
Simmons Machine Tool Corporation 38
Southington Hdwe. Mfg. Co., The 26
Standard Tube Co., The 159
Steel Equipment Co. 50
Sterling Bolt Co. 26
Stronghold Screw Products, Inc. 26
Sturtevant, P. A., Co. 171, 175
Sundstrand Machine Tool Co., American Broach & Machine Co. Division 143
Sun Shipbuilding & Dry Dock Co. 31

Tennessee Coal & Iron Division, United States Steel Corporation 33
Threadwell Tap & Die Co. 120
Tide Water Associated Oil Co. 21
Timken Roller Bearing Co., The Back Cover
Torrington Co., The, Swager Department 180

Union Carbide & Carbon Corporation, Bakelite Co. 99
Union Carbide & Carbon Corporation, National Carbon Co. 170
United States Steel Corp., Subsidiaries 33, 51, 116, 157
United States Steel Export Co. 33, 51
United States Steel Supply Division, United States Steel Corporation 116

Vanadium-Alloys Steel Co. 45

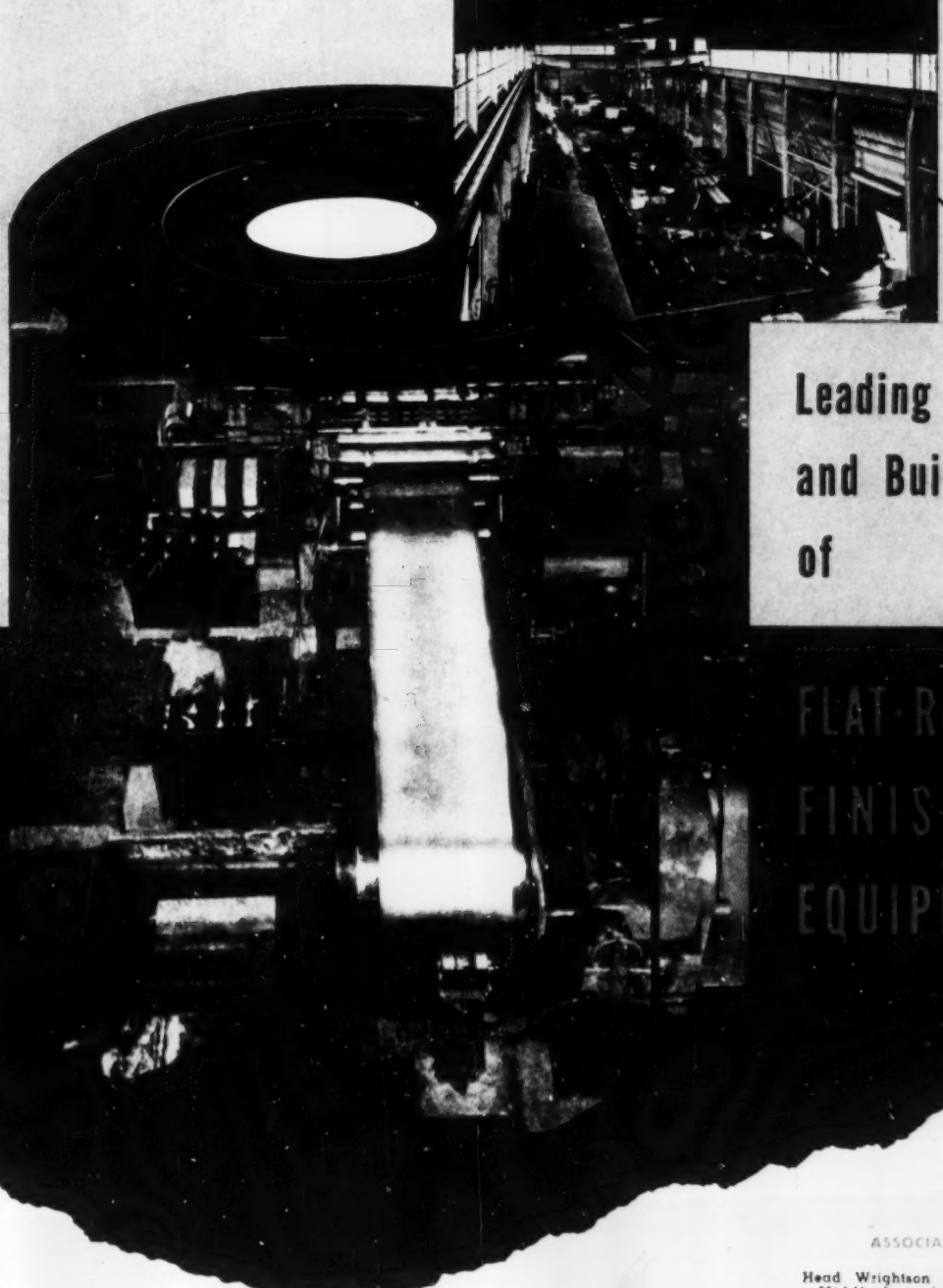
Wales-Beech Corp. 26
Ward Steel Co. 171
Washington Steel Corporation 152
Waterbury Farrel Foundry & Machine Co. 113
Wean Equipment Corporation 18, 19
Wellman Engineering Co., The 7
Wheland Co., The 175
Whitehead Stamping Co. 174
Wood, R. D., Co. 24

Yoder Co., The 36

Table of Contents, Page 5

Classified Advertising Pages 178, 179

THE AETNA-STANDARD ENGINEERING COMPANY



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M. Castellvi, Inc., New York, N. Y. Mexico, Central and South America.

Societe de Constructions de Montbard, Paris, France France, Belgium, Holland, Luxembourg, Switzerland.

Demag Aktiengesellschaft, Duisburg, Germany Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.

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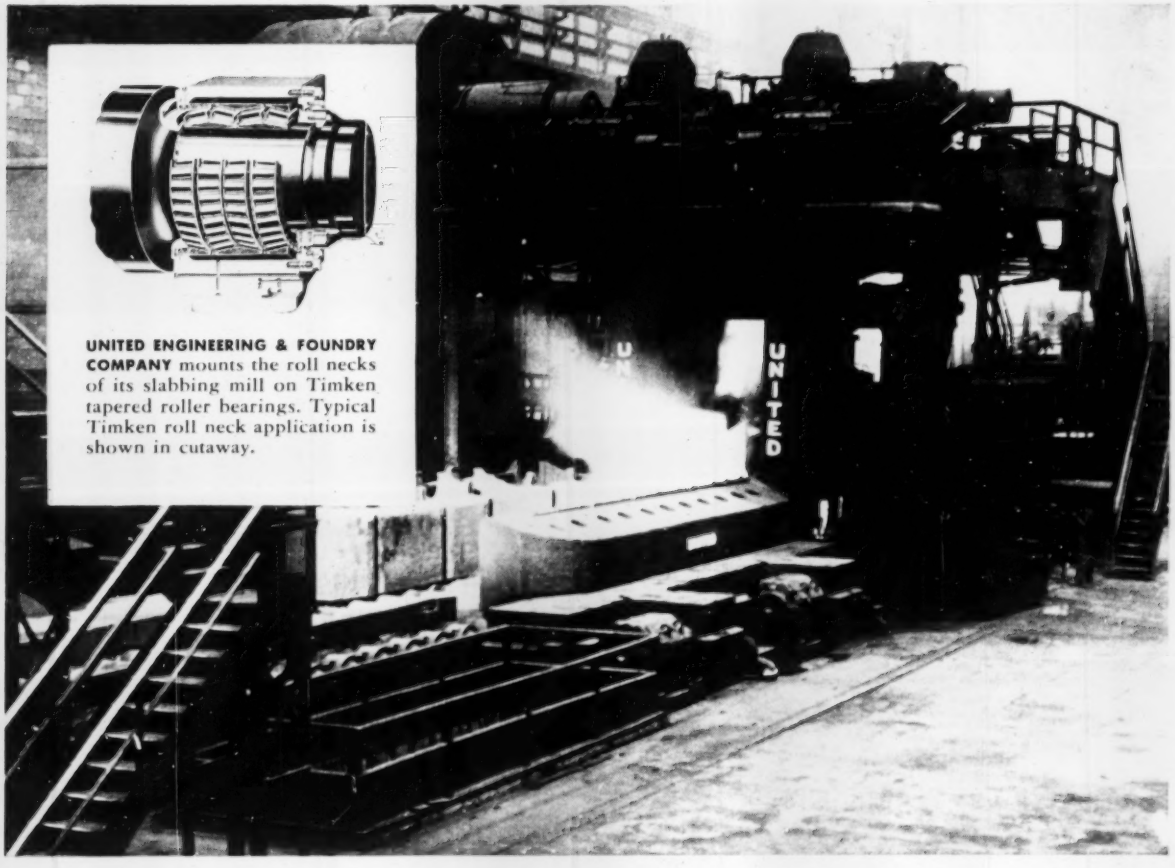
Timken tapered roller bearings give you greater mill rigidity, permit larger diameter roll necks. Costly and complicated lubrication systems are eliminated.

And because they take radial and thrust loads in any combination, no special thrust bearings are needed.

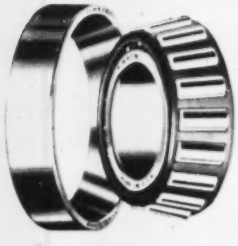
Years of research and development by The Timken Company have resulted in many improvements in roll neck bearing design and performance. For further information write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN BEARING EQUIPPED

This symbol on a product means its bearings are the best.

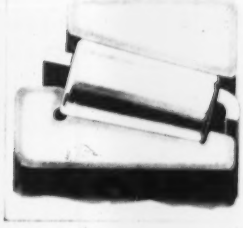


UNITED ENGINEERING & FOUNDRY COMPANY mounts the roll necks of its slabbing mill on Timken tapered roller bearings. Typical Timken roll neck application is shown in cutaway.



TIMKEN

TAPERED ROLLER BEARINGS



HARD ON THE OUTSIDE, TOUGH ON THE INSIDE

Rollers and races of Timken bearings are case-carburized to give a hard, wear resisting surface and a tough, shock-resisting core. Result: longer bearing life.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.